



**SUPPLY AND INSTALLATION OF 2 NO
2MVA STANDBY GENERATORS AND
ASSOCIATED WORKS AT JOMO KENYATTA
INTERNATIONAL AIRPORT
(Re-tender)**

TENDER NO. KAA/OT/JKIA/I534/2018-2019

JUNE, 2019

MANAGING DIRECTOR
KENYA AIRPORTS AUTHORITY
P.O. BOX 19001 - 00501
NAIROBI

GENERAL MANAGER (P&ES)
KENYA AIRPORTS AUTHORITY
P.O. BOX 19001 - 00501
NAIROBI

TABLE OF CONTENTS

	<u>PAGE</u>
SECTION I: INVITATION FOR TENDERS	3
SECTION II: INSTRUCTIONS TO TENDERERS	5
SECTION III: APPENDIX TO INSTRUCTIONS TO TENDERERS.....	23
SECTION IV: CONDITIONS OF CONTRACT (INCLUDING ERECTION ON SITE).....	31
SECTION V: TECHNICAL SPECIFICATIONS	40
SECTION VI: DRAWINGS	79
SECTION VII: BILLS OF QUANTITIES.....	81
SECTION VIII: STANDARD FORMS.....	93

SECTION I: INVITATION FOR TENDERS

4th June 2019

Tender No.: KAA/OT/JKIA/I534/2018-2019

Tender Name: SUPPLY AND INSTALLATION OF 2 NO 2MVA STANDBY GENERATORS AND ASSOCIATED WORKS AT JOMO KENYATTA INTERNATIONAL AIRPORT

- I.1 Kenya Airports Authority invites sealed bids from eligible Tenderers for Supply and Installation of Emergency Standby Generators at Jomo Kenyatta International Airport
- I.2 Interested eligible firms may obtain further information and inspect the tender documents at the Kenya Airports Authority Headquarters at JKIA, 2nd Floor, office of the GM (Procurement & Logistics) from 8.00 am to 5.00 pm local time, Monday to Friday except lunch time between 1.00 pm and 2.00 pm and on public holidays.
- I.3 A complete set of tender documents in English language may be obtained by interested candidates upon payment of non-refundable fees of Kenya Shillings One Thousand Only (Kshs. 1,000/-) or an equivalent amount in freely convertible currency in cash or Bankers cheque payable to the Managing Director, Kenya Airports Authority. However, the tender document can also be downloaded from Kenya Airports Authority website (www.kaa.go.ke) or Public Procurement Information Portal (www.ppip.go.ke) and thereafter bidders can forward their company's details to tenders@kaa.go.ke so that any addendum/clarifications can be sent to their email address.
- I.4 Prices quoted should be net and must be in Kenya shillings and shall remain valid for 120 days from the closing date of Tender.
- I.5 Completed tender documents serialized from the first to last page including any attachments shall be submitted in plain sealed envelopes clearly marked with the Tender number and name and marked "DO NOT OPEN BEFORE 21st June, 2019 at 11.00 a.m." and addressed to:

**Managing Director
Kenya Airports Authority
P. O. Box 19001- 00501
NAIROBI, KENYA**

and deposited in the Tender Box situated on 2nd Floor, Kenya Airports Authority Headquarters.

- I.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at the Conference Room, 1th Floor, Kenya Airports Authority Headquarters complex building.

- I.7 The Tender Security shall be Kenya Shillings two million (2,000,000.00) and shall be valid for 150 days from the date of tender opening.
- I.8 A Site Visit & Pre-bid meeting will be held at Jomo Kenyatta International Airport on **19th June 2019** at 10.00 a.m. Bidders to Congregate at the Conference room located on the roof of the Parking Garage.
- I.9 Any additional information, addendums or clarifications in respect to this tender will be available in our KAA website <https://kaa.go.ke/corporate/procurement/> portal All bidders are advised to regularly check the website during the bidding period.
- I.10 Canvassing for the tender by the tenderer or by proxy shall lead to automatic disqualification of their tender.

GM (PROCUREMENT & LOGISTICS)
For: MANAGING DIRECTOR/CEO

SECTION II: INSTRUCTIONS TO TENDERERS

TABLE OF CLAUSES

<u>CLAUSE NUMBERS</u>	<u>PAGE</u>
GENERAL	
1. DEFINITIONS	7
2. ELIGIBILITY AND QUALIFICATION REQUIREMENTS.....	7
3. COST OF TENDERING.....	8
4. SITE VISIT	9
TENDER DOCUMENTS	
5. TENDER DOCUMENTS	9
6. INQUIRIES BY TENDERERS.....	10
7. AMENDMENT OF TENDER DOCUMENTS.....	10
PREPARATION OF TENDERS	
8. LANGUAGE OF TENDER	11
9. DOCUMENTS COMPRISING THE TENDER	11
10. TENDER PRICES.....	11
11. CURRENCIES OF TENDER AND PAYMENT	12
12. TENDER VALIDITY.....	13
13. TENDER SECURITY	13
14. NO ALTERNATIVE OFFERS.....	14
15. PRE-TENDER MEETING	14
16. FORMAT AND SIGNING OF TENDERS.....	15
SUBMISSION OF TENDERS	
17. SEALING AND MARKING OF TENDERS.....	15
18. DEADLINE FOR SUBMISSION OF TENDERS.....	15
19. MODIFICATION AND WITHDRAWAL OF TENDERS.....	16
TENDER OPENING AND EVALUATION	

20. TENDER OPENING.....	16
21. PROCESS TO BE CONFIDENTIAL.....	17
22. CLARIFICATION TENDERS.....	17
23. DETERMINATION OF RESPONSIVENESS.....	18
24. CORRECTION OF ERRORS.....	18
25. CONVERSION TO SINGLE CURRENCY.....	19
26. EVALUATION AND COMPARISON OF TENDERS.....	19
27. PREFERENCE IN EVALUATION.....	20

AWARD OF CONTRACT

28. AWARD CRITERIA.....	20
29. NOTIFICATION OF AWARD AND SIGNING OF CONTRACT.....	20
30. PERFORMANCE GUARANTEE.....	21
31. ADVANCE PAYMENT.....	21
32. CORRUPT AND FRAUDULENT PRACTICES.....	21

GENERAL

I. Definitions

- (a) **“Tenderer”** means any person or persons partnership firm or company submitting a sum or sums in the Bills of Quantities in accordance with the Instructions to Tenderers, Conditions of Contract Parts I and II, Specifications, Drawings and Bills of Quantities for the work contemplated, acting directly or through a legally appointed representative.
- (b) **“Approved tenderer”** means the tenderer who is approved by the Employer.
- (c) Any noun or adjective derived from the word **“tender”** shall be read and construed to mean the corresponding form of the noun or adjective **“bid”**. Any conjugation of the verb “tender” shall be read and construed to mean the corresponding form of the verb “bid.”
- (d) **“Employer”** means a Central Government Ministry, Local Authority, State Corporation or any other Public Institution.

2. Eligibility and Qualification Requirements

- 2.1 This invitation to tender is open to all tenderers who are eligible as stated in the appendix.
- 2.2 The procuring entity’s employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.
- 2.3 To be qualified for award of Contract, the tenderer shall provide evidence satisfactory to the Employer of their eligibility under Sub clause 2.1 above and of their capability and adequacy of resources to effectively carry out the subject Contract. To this end, the tenderer shall be required to update the following information already submitted during prequalification:-
 - (a) Details of experience and past performance of the tenderer on the works of a similar nature within the past five years and details of current work on hand and other contractual commitments.
 - (b) The qualifications and experience of key personnel proposed for administration and execution of the contract, both on and off site.
 - (c) Major items of construction plant and equipment proposed for use in carrying out the Contract. Only reliable plant in good working order and suitable for the work required of it shall be shown on this schedule. The tenderer will also indicate on this schedule when each item will be available on the Works. Included also should be a schedule of plant, equipment and material to be imported for the purpose of the Contract, giving details of make, type, origin and CIF value as appropriate.

- (d) Details of subcontractors to whom it is proposed to sublet any portion of the Contract and for whom authority will be requested for such subletting in accordance with clause 4 of the Conditions of Contract.
- (e) A draft Program of Works in the form of a bar chart and Schedule of Payment which shall form part of the Contract if the tender is accepted. Any change in the Program or Schedule shall be subjected to the approval of the Engineer.
- (f) Details of any current litigation or arbitration proceedings in which the Tenderer is involved as one of the parties.

2.4 Joint Ventures

Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements:-

- (a) The tender, and in case of a successful tender, the Form of Agreement, shall be signed so as to be legally binding on all partners.
- (b) One of the partners shall be nominated as being in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.
- (c) The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the Contract including payment shall be done exclusively with the partner in charge.
- (d) All partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Form of Tender and the Form of Agreement (in case of a successful tender).
- (e) A copy of the agreement entered into by the joint venture partners shall be submitted with the tender.

2.5 To qualify for contract awards, the tenderer shall have the following:

- (a) Necessary qualifications, capability experience, services, equipment and facilities to provide what is being procured.
- (b) Legal capacity to enter into a contract for procurement
- (c) Shall not be insolvent, in receivership, bankrupt or in the process of being wound up and is not the subject of legal proceedings relating to the foregoing.
- (d) Shall not be debarred from participating in public procurement.

3. Cost of Tendering

- 3.1 The tenderer shall bear all costs associated with the preparation and submission of his tender and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.
- 3.2 The price to be charged for the tender document shall not exceed Kshs.1,000/=
- 3.3 The procuring entity shall allow the tenderer to view the tender document free of charge before purchase.

4. Site Visit

- 4.1 The tenderer is advised to visit and examine the Site and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the Site shall be the tenderer's own responsibility.
- 4.2 The tenderer and any of his personnel or agents will be granted permission by the Employer to enter upon premises and lands for the purpose of such inspection, but only upon the express condition that the tenderer, his personnel or agents, will release and indemnify the Employer from and against all liability in respect of, and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission, would not have arisen.
- 4.3 The Employer shall organize a site visit at a date to be notified. A representative of the Employer will be available to meet the intending tenderers at the Site.

Tenderers must provide their own transport. The representative will not be available at any other time for site inspection visits.

Each tenderer shall complete the Certificate of Tenderer's Visit to the Site, whether he in fact visits the Site at the time of the organized site visit or by himself at some other time.

TENDER DOCUMENTS

5. Tender Documents

- 5.1 The Tender documents comprise the documents listed here below and should be read together with any Addenda issued in accordance with Clause 7 of these instructions to tenderers.
 - a. Form of Invitation for Tenders
 - b. Instructions to Tenderers
 - c. Form of Tender
 - d. Appendix to Form of Tender

- e. Form of Tender Surety
- f. Statement of Foreign Currency Requirements
- g. Form of Performance Security
- h. Form of Agreement
- i. Form of Advance payment Bank Guarantee
- j. Schedules of Supplementary Information
- k. General Conditions of Contract – Part I
- l. Conditions of Particular Application – Part II
- m. Specifications
- n. Bills of Quantities
- o. Drawings
- p. Declaration Form

5.2 The tenderer is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the tender documents. Failure to comply with the requirements for tender submission will be at the tenderer's own risk. Pursuant to clause 22 of Instructions to Tenderers, tenders which are not substantially responsive to the requirements of the tender documents will be rejected.

5.3 All recipients of the documents for the proposed Contract for the purpose of submitting a tender (whether they submit a tender or not) shall treat the details of the documents as "private and confidential".

6. Inquiries by tenderers

6.1 A tenderer making inquiries relating to the tender documents may notify the Employer in writing or by telex, cable or facsimile at the Employer's mailing address indicated in the Invitation to Tender. The Employer will respond in writing to any request for clarification which he receives earlier than 7 days prior to the deadline for the submission of tenders. Written copies of the Employer's response (including the query but without identifying the source of the inquiry) will be sent to all prospective tenderers who have purchased the tender documents.

6.2 Clarification of tenders shall be requested by the tenderer to be received by the procuring entity not later than 7 days prior to the deadline for submission of tenders.

6.3 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.

7. Amendment of Tender Documents

7.1 At any time prior to the deadline for submission of tenders the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective tenderer, modify the tender documents by issuing Addenda.

- 7.2 Any Addendum will be notified in writing or by cable, telex or facsimile to all prospective tenderers who have purchased the tender documents and will be binding upon them.
- 7.3 In order to allow prospective tenderers reasonable time in which to take the Addendum into account in preparing their tenders, the Employer may, at his discretion, extend the deadline for the submission of tenders.

PREPARATION OF TENDERS

8. Language of Tender

- 8.1 The tender and all correspondence and documents relating to the tender exchanged between the tenderer and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the tenderer with the tender may be in another language provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the tender, the English language shall prevail.

9. Documents Comprising the Tender

- 9.1 The tender to be prepared by the tenderer shall comprise:-
- i. The form of tender and appendix thereto.
 - ii. A tender security.
 - iii. The priced Bill of Quantity and Schedule.
 - iv. The information on eligibility and qualification.
 - v. Any other materials required to be completed and submitted in accordance with the instructions to tenderers.

The Forms, Bills of Quantities and Schedules provided in the tender documents shall be used without exception (subject to extensions of the schedules in the same format and to the provisions of clause 13.2 regarding the alternative forms of Tender Surety).

10. Tender Prices

- 10.1 All the insertions made by the tenderer shall be made in INK and the tenderer shall clearly form the figures. The relevant space in the Form of Tender and Bills of Quantities shall be completed accordingly without interlineations or erasures except those necessary to correct errors made by the tenderer in which case the erasures and interlineations shall be initialed by the person or persons signing the tender.
- 10.2 A price or rate shall be inserted by the tenderer for every item in the Bills of Quantities whether the quantities are stated or not. Items against which no rate or price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bills of Quantities.

The prices and unit rates in the Bills of Quantities are to be the full [all-inclusive] value of the work described under the items, including all costs and expenses which may be necessary and all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based. All duties and taxes and other levies payable by the Contractor under the Contract or for any other cause prior to the deadline for the submission of tenders, shall be included in the rates and prices and the total tender prices submitted by the Tenderer.

Each price or unit rate inserted in the Bills of Quantities should be a realistic estimate for completing the activity or activities described under that particular item and the tenderer is advised against inserting a price or rate against any item contrary to this instruction.

Every rate entered in the Bills of Quantities, whether or not such rate be associated with a quantity, shall form part of the Contract. The Employer shall have the right to call for any item of work contained in the Bills of Quantities, and such items of work to be paid for at the rate entered by the tenderer and it is the intention of the Employer to take full advantage of unbalanced low rates.

- 10.3 Unless otherwise specified the tenderer must enter the amounts representing 10% of the sub-total of the summary of the Bills of Quantities for Contingencies and Variation of Prices [V.O.P.] payments in the summary sheet and add them to the sub-total to arrive at the tender amount.
- 10.4 The tenderer shall furnish with his tender written confirmation from his suppliers or manufacturers of unit rates for the supply of items listed in the Conditions of Contract clause 47 where appropriate.
- 10.5 The rates and prices quoted by the tenderer are subject to adjustment during the performance of the Contract only in accordance with the provisions of the Conditions of Contract. The tenderer shall complete the schedule of basic rates and shall submit with his tender such other supporting information as required under clause 47 of the Conditions of Contract Part II.

11. Currencies of Tender and Payment

- 11.1 Tenders shall be priced in Kenya Shillings and the tender sum shall be in Kenya Shillings.
- 11.2 Tenderers are required to indicate in the Statement of Foreign Currency Requirements, which forms part of the tender, the foreign currency required by them. Such currency should generally be the currency of the country of the tenderer's main office. However, if a substantial portion of the tenderer's expenditure under the Contract is expected to be in countries other than his country of origin, then he may state a corresponding portion of the contract price in the currency of those other countries. However, the foreign currency

element is to be limited to two (2) different currencies and a maximum of 30% (thirty percent) of the Contract Price.

11.3 The rate or rates of exchange used for pricing the tender shall be selling rate or rates of the Central Bank ruling on the date thirty (30) days before the final date for the submission of tenders.

11.4 Tenderers must enclose with their tenders, a brief justification of the foreign currency requirements stated in their tenders.

12. Tender Validity

12.1 The tender shall remain valid and open for acceptance for a period of sixty (60) days from the specified date of tender opening or from the extended date of tender opening (in accordance with clause 7.4 here above) whichever is the later.

12.2 In exceptional circumstances prior to expiry of the original tender validity period, the Employer may request the tenderer for a specified extension of the period of validity. The request and the responses thereto shall be made in writing or by cable, telex or facsimile. A tenderer may refuse the request without forfeiting his Tender Surety. A tenderer agreeing to the request will not be required nor permitted to modify his tender, but will be required to extend the validity of his Tender Surety correspondingly.

13. Tender Security

13.1 The tenderer shall furnish as part of his tender, a Tender Security in the amount and form stated in the Appendix to Instructions to Tenderers.

13.2 The tender security shall not exceed 2 percent of the tender price.

13.3 The tender security shall be valid for at least thirty (30) days beyond the tender validity period.

The format of the Surety shall be in accordance with the sample form of Tender Surety included in these tender documents; other formats may be permitted subject to the prior approval of the Employer. The Tender Surety shall be valid for thirty (30) days beyond the tender validity period.

13.4 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.

13.5 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible, but not later than fourteen (14) days after concluding the Contract execution and after a Performance Security has been furnished by the successful tenderer. The Tender Surety of the successful tenderer will be returned upon the tenderer executing the Contract and furnishing the required Performance Security.

13.6 The Tender Surety may be forfeited:

- (a) if a tenderer withdraws his tender during the period of tender validity:
or
- (b) in the case of a successful tenderer, if he fails
 - (i) to sign the Agreement, or
 - (ii) to furnish the necessary Performance Security
- (c) if a tenderer does not accept the correction of his tender price pursuant to clause 23.

14. No Alternative Offers

14.1 The tenderer shall submit an offer which complies fully with the requirements of the tender documents unless otherwise provided for in the appendix.

Only one tender may be submitted by each tenderer either by himself or as partner in a joint venture.

14.2 The tenderer shall not attach any conditions of his own to his tender. The tender price must be based on the tender documents. The tenderer is not required to present alternative construction options and he shall use without exception, the Bills of Quantities as provided, with the amendments as notified in tender notices, if any, for the calculation of his tender price.

Any tenderer who fails to comply with this clause will be disqualified.

15. Pre-Tender Meeting

15.1 If a pre tender meeting is convened the tenderer's designated representative is invited to attend a pre-tender meeting, which if convened, will take place at the venue and time stated in the Invitation to Tender. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

15.2 The tenderer is requested as far as possible to submit any questions in writing or by cable, to reach the Employer not later than seven days before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted in accordance with the following:

- (a) Minutes of the meeting, including the text of the questions raised and the responses given together with any responses prepared after the meeting will be transmitted without delay to all purchasers of the tender documents. Any modification of the tender documents listed in

– Clause 9 which may become necessary as a result of the pre-tender meeting shall be made by the Employer exclusively through the issue of a tender notice pursuant to Clause 7 and not through the minutes of the pre-tender meeting.

- (b) Non attendance at the pre-tender meeting will not be cause for disqualification of a bidder.

16. Format and Signing of Tenders

- 16.1 The tenderer shall prepare his tender as outlined in clause 9 above and mark appropriately one set “ORIGINAL” and the other “COPY”.
- 16.2 The copy of the tender and Bills of Quantities shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the tenderer. All pages of the tender where amendments have been made shall be initialed by the person or persons signing the tender.
- 16.3 The complete tender shall be without alterations, interlineations or erasures, except as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person of persons signing the tender.

SUBMISSION OF TENDERS

17. Sealing and Marking of Tenders

- 17.1 The tenderer shall seal the original and copy of the tender in separated envelopes, duly marking the envelopes as “ORIGINAL” and “COPY”. The envelopes shall then be sealed in an outer envelope.
- 17.2 The inner and outer envelopes shall be addressed to the Employer at the address stated in the Appendix to Instructions to Tenderers and bear the name and identification of the Contract stated in the said Appendix with a warning not to open before the date and time for opening of tenders stated in the said Appendix.
- 17.3 The inner envelopes shall each indicated the name and address of the tenderer to enable the tender to be returned unopened in case it is declared “late”, while the outer envelope shall bear no mark indicating the identity of the tenderer.
- 17.4 If the outer envelope is not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. A tender opened prematurely for this cause will be rejected by the Employer and returned to the tenderer.

18. Deadline for Submission of Tenders

- 18.1 Tenders must be received by the Employer at the address specified in clause 17.2 and on the date and time specified in the Letter of Invitation, subject to the provisions of clause 7.4, 18.2 and 18.3.

Tenders delivered by hand must be placed in the “tender box” provided in the office of the Employer.

Proof of posting will not be accepted as proof of delivery and any tender delivered after the above stipulated time, from whatever cause arising will not be considered.

- 18.2 The Employer may, at his discretion, extend the deadline for the submission of tenders through the issue of an Addendum in accordance with clause 7, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline shall thereafter be subject to the new deadline as extended.
- 18.3 Any tender received by the Employer after the prescribed deadline for submission of tender will be returned unopened to the tenderer.

19. Modification and Withdrawal of Tenders

- 19.1 The tenderer may modify or withdraw his tender after tender submission, provided that written notice of the modification or withdrawal is received by the Employer prior to prescribed deadline for submission of tenders.
- 19.2 The tenderer’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions for the submission of tenders, with the inner and outer envelopes additionally marked “MODIFICATION” or “WITHDRAWAL” as appropriate.
- 19.3 No tender may be modified subsequent to the deadline for submission of tenders.
- 19.4 No tender may be withdrawn in the interval between the deadline for submission of tenders and the period of tender validity specified on the tender form. Withdrawal of a tender during this interval will result in the forfeiture of the Tender Surety.
- 19.5 Subsequent to the expiration of the period of tender validity prescribed by the Employer, and the tenderer having not been notified by the Employer of the award of the Contract or the tenderer does not intend to conform with the request of the Employer to extend the prior of tender validity, the tenderer may withdraw his tender without risk of forfeiture of the Tender Surety.

TENDER OPENING AND EVALUATION

20. Tender Opening

- 20.1 The Employer will open the tenders in the presence of the tenderers' representatives who choose to attend at the time and location indicated in the Letter of Invitation to Tender. The tenderers' representatives who are present shall sign a register evidencing their attendance.
- 20.2 Tenders for which an acceptable notice of withdrawal has been submitted, pursuant to clause 19, will not be opened. The Employer will examine the tenders to determine whether they are complete, whether the requisite Tender Sureties have been furnished, whether the documents have been properly signed and whether the tenders are generally in order.
- 20.3 At the tender opening, the Employer will announce the tenderer's names, total tender price, tender price modifications and tender withdrawals, if any, the presence of the requisite Tender Surety and such other details as the Employer, at his discretion, may consider appropriate. No tender shall be rejected at the tender opening except for late tenders.
- 20.4 The Employer shall prepare a tender opening register and minutes of the tender opening including the information disclosed to those present.
- 20.5 Tenders not opened and read out at tender opening shall not be considered further for evaluation, irrespective of the circumstances.

21. Process to be Confidential

- 21.1 After the public opening of tenders, information relating to the examination, clarification, evaluation and comparisons of tenders and recommendations concerning the award of Contract shall not be disclosed to tenderers or other persons not officially concerned with such process until the award of Contract is announced.
- 21.2 Any effort by a tenderer to influence the Employer in the process of examination, evaluation and comparison of tenders and decisions concerning award of Contract may result in the rejection of the tenderer's tender.

22. Clarification Tenders

- 22.1 To assist in the examination, evaluation and comparison of tenders, the Employer may ask tenderers individually for clarification of their tenders, including breakdown of unit prices. The request for clarification and the response shall be in writing or by cable, facsimile or telex, but no change in the price or substance of the tender shall be sought, offered or permitted except as required to confirm the correction of arithmetical errors discovered by the employer during the evaluation of the tenders in accordance with clause 24.
- 22.2 No Tenderer shall contact the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. If the tenderer wishes to bring additional information to the notice of the Employer, he shall do so in writing.

23. Determination of Responsiveness

- 23.1 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender is substantially responsive to the requirements of the tender documents.
- 23.2 For the purpose of this clause, a substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tender documents without material deviation or reservation. A material deviation or reservation is one which affects in any substantial way the scope, quality, completion timing or administration of the Works to be undertaken by the tenderer under the Contract, or which limits in any substantial way, inconsistent with the tender documents, the Employer's rights or the tenderers obligations under the Contract and the rectification of which would affect unfairly the competitive position of other tenderers who have presented substantially responsive tenders.
- 23.3 Each price or unit rate inserted in the Bills of Quantities shall be a realistic estimate of the cost of completing the works described under the particular item including allowance for overheads, profits and the like. Should a tender be seriously unbalanced in relation to the Employer's estimate of the works to be performed under any item or groups of items, the tender shall be deemed not responsive.
- 23.4 A tender determined to be not substantially responsive will be rejected by the Employer and may not subsequently be made responsive by the tenderer by correction of the non-conforming deviation or reservation.

24. Correction of Errors

Tenders determined to be substantially responsive shall be checked by the Employer for any arithmetic errors in the computations and summations. Errors will be corrected by the Employer as follows:

- (a) Where there is a discrepancy between the amount in figures and the amount in words, the amount in words will govern.
- (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case adjustment will be made to the entry containing that error.
- (c) The amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 13.

25. Conversion to Single Currency

- 25.1 For compensation of tenders, the tender price shall first be broken down into the respective amounts payable in various currencies by using the selling rate or rates of the Central Bank of Kenya ruling on the date twenty one (21) days before the final date for the submission of tenders.
- 25.2 The Employer will convert the amounts in various currencies in which the tender is payable (excluding provisional sums but including Day-works where priced competitively) to Kenya Shillings at the selling rates stated in clause 25.1.

26. Evaluation and Comparison of Tenders

- 26.1 The Employer will evaluate only tenders determined to be substantially responsive to the requirements of the tender documents in accordance with clause 23.
- 26.2 In evaluating tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:
- (a) Making any correction for errors pursuant to clause 24.
 - (b) Excluding Provisional Sums and provision, if any, for Contingencies in the Bills of Quantities, but including Day works where priced competitively.
- 26.3 The Employer reserves the right to accept any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in the accrual of unsolicited benefits to the Employer, shall not be taken into account in tender evaluation.
- 26.4 Price adjustment provisions in the Conditions of Contract applied over the period of execution of the Contract shall not be taken into account in tender evaluation.
- 26.5 If the lowest evaluated tender is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the Contract, the Employer may require the tenderer to produce detailed price analyses for any or all items of the Bills of Quantities, to demonstrate the relationship between those prices, proposed construction methods and schedules. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of subsequent default of the successful tenderer under the Contract.

- 26.6 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Contract Price excluding Provisional Sums to a non-indigenous sub-contractor.
- 26.7 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.
- 26.8 Persons not officially involved in the evaluation of tender shall not attempt in any way to influence the evaluation.

27. Preference in Evaluation

Preference where allowed in the evaluation of tenders shall not exceed 15%

AWARD OF CONTRACT

28. Award criteria

- 28.1 Subject to clause 27.2, the Employer will award the Contract to the tenderer whose tender is determined to be substantially responsive to the tender documents and who has offered the lowest evaluated tender price subject to possessing the capability and resources to effectively carry out the Contract Works.
- 28.2 The Employer reserves the right to accept or reject any tender, and to annul the tendering process and reject all tenders, at any time prior to award of Contract, without thereby incurring any liability to the affected tenderers or any obligation to inform the affected tenderers of the grounds for the Employer's action.

29. Notification of Award and signing of contract

- 29.1 Prior to the expiration of the period of tender validity prescribed by the Employer, the Employer will notify the successful tenderer by cable, telefax or telex and confirmed in writing by registered letter that his tender has been accepted. This letter (hereinafter and in all Contract documents called "Letter of Acceptance") shall name the sum (hereinafter and in all Contract documents called "the Contract Price") which the Employer will pay to the Contractor in consideration of the execution and completion of the Works as prescribed by the Contract.
- 29.2 Upon the furnishing of a Performance Security by the successful tenderer, the unsuccessful tenderers will promptly be notified that their tenders have been unsuccessful.
- 29.3 At the same time the employer notifies the successful tenderer that his tender has been accepted, the employer shall notify the other tenderers that their tenders have been unsuccessful.
- 29.4 Within fourteen [14] days of receipt of the form of Contract Agreement from the Employer, the successful tenderer shall sign the form and return it to the Employer together with the required Performance Security.

29.5 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.

29.6 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

30. Performance Guarantee

30.1 Within twenty eight [28] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in an amount stated in the Appendix to Instructions to Tenderers.

30.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Bank Guarantee issued at the tenderer's option by an established and a reputable Bank approved by the Employer and located in the Republic of Kenya and shall be divided into two elements namely, a performance security payable in foreign currencies (based upon the exchange rates determined in accordance with clause 35.4 of the Conditions of Contract) and a performance security payable in Kenya Shillings. The value of the two securities shall be in the same proportions of foreign and local currencies as requested in the form of foreign currency requirements.

30.3 Failure of the successful tenderer to lodge the required Performance Security shall constitute a breach of Contract and sufficient grounds for the annulment of the award and forfeiture of the Tender Security and any other remedy under the Contract the Employer may award the Contract to the next ranked tenderer.

31. Advance Payment

An advance payment, if approved by the Employer, shall be made under the Contract, if requested by the Contractor, in accordance with clause 33.1 of the Conditions of Contract. The Advance Payment Guarantee shall be denominated in the proportion and currencies named in the form of foreign currency requirements. For each currency, a separate guarantee shall be issued. The guarantee shall be issued by a bank located in the Republic of Kenya, or a foreign bank through a correspondent bank located in the Republic of Kenya, in either case subject to the approval of the Employer.

32. Corrupt and fraudulent practices.

The procuring entity requires that tenderers to observe the highest standard of ethics during the procurement process and execution of contract. A tenderer shall sign a declaration that he has not and will not be involved in corrupt or fraudulent practices.

SECTION III: APPENDIX TO INSTRUCTIONS TO TENDERERS

The following information regarding the particulars of the tender shall complement supplement or amend the provisions of the instructions to tenderers. Wherever there is a conflict between the provision of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers.

CLAUSE	
1 (d)	Employer means; Kenya Airports Authority , a State Corporation established under the Laws of Kenya.
2.1	All qualified tenderers are eligible. Tenderers shall submit copies of original documents as a proof that they meet all the requirements of the evaluation criteria below : In case of Joint Venture, parties must submit required documents.
2.3	No pre-qualification has been carried out for the contract. Tenderers and all parties forming Joint Ventures if applicable shall provide evidence of their eligibility as required under Sub clause 2.1, sub clauses 2.3 a, b, c, d, and e and sub clause 2.5.
2.3 (a)	Demonstration of past experience and performance: Tenderer to meet the requirements indicated in the evaluation criteria below.
2.3 (b)	Qualifications and experience of key personnel: Tenderer to meet the requirements indicated in the evaluation criteria below.
2.3 (d)	Details of subcontractors to whom it may be proposed to sublet any portion of the Contract and for whom authority will be requested for such subletting in accordance with clause 4 of the Conditions of Contract.
2.3 (e)	Tenderer shall submit a detailed draft Program of Works in the form of a bar chart or another suitable form and Schedule of Payment which shall form part of the Contract if the tender is accepted. Sub clause is applicable.
2.5 (a)	Tenderer's financial capability: Tenderer to meet the requirements indicated in the evaluation criteria below.
4.3	A site visit shall be convened on 19th June, 2019 at 10:00a.m on the roof top of parking garage at Jomo Kenyatta International Airport. Tenderers are required to attend the site visit to confirm any requirements that may affect their financial offer.

CLAUSE	
6.1	<p>The name and address of the Employer for the purposes of making inquiries by tenderers is:-</p> <p>General Manager Procurement and Logistics, Kenya Airports Authority, P. O. Box 19001 – 00501, NAIROBI-KENYA. Email: tenders@kaa.go.ke</p> <p>The Employer will respond in writing to any request for clarification which he receives earlier than 3 days prior to the deadline for the submission of tenders.</p>
10.2	<p>In addition to the prices for supply and installation indicated in the bills of quantities, the tenderers shall also quote costs for:-</p> <p>(i) <i>Maintenance of the emergency generator sets in accordance with manufacturer's recommendations for a period of three (3) years broken down in total annual maintenance costs and further in to costs for single maintenance,</i></p> <p>The additional costs (i) above shall be quoted separately and shall not be included in the total price filled in the form of tender, but shall be considered in determining equipment life cycle. The prices shall be payable after carrying out the maintenance. This shall be quoted as in the following options;</p> <ul style="list-style-type: none"> • Total maintenance costs for a period of 5 years quoted annually and broken down into costs for each maintenance, <p>A separate contract for the maintenance including a service level agreement shall be entered into on annual basis. The contract shall be renewed annually on mutual agreement of the two parties after contractor's successful performance.</p> <p>The maintenance shall include planned preventive maintenance and on call attendance of the equipment based on a service level agreement signed by the parties. Attendance on call shall be met within a three hours period. The costs shall be denominated as follows and shall be quoted separately and only payable once service/maintenance is carried out</p> <ul style="list-style-type: none"> • Price of labour per service, • Price of lubricants and all other maintenance consumable materials. The maintenance materials shall be listed and their rates of prices given, • Prices of spare parts, • Prices for on call attendance. <p>The bidder shall tabulate the full life-cycle cost of equipment for 5 years.</p>

CLAUSE	
10.5	Prices shall be fixed.
11.3	Replace words " <u>thirty (30)</u> " with words " <u>twenty one (21)</u> " however for purposes of evaluation the rate of exchange to be used is that ruling on the date of tender submission.
12.1	Replace words; " <u>sixty (60)</u> " with words " <u>one hundred and twenty (120)</u> "
15.2 (b)	Non-attendance at the pre-tender meeting will be cause for disqualification of a Tenderer.
13.1 and 13.2	<p>Tender Security shall be of a value of Kenya Shillings two million (Kshs.2,000,000.00) equivalent. The tender security shall be in the form of</p> <ul style="list-style-type: none"> a) Cash or b) Banker's cheque or c) A bank guarantee or d) Such insurance guarantee approved by the Public Procurement Regulatory Authority (The insurance policy number must be provided) or e) Letter of credit.
17.2	<p>The name and address of the Employer for the purposes of submission of tenders is:-</p> <p>THE MANAGING DIRECTOR/CEO Kenya Airports Authority, 3rd floor, Kenya Airports Authority Headquarters, Airport North Road, P. o. Box 19001 – 00501 NAIROBI-KENYA,</p>
17.2	<p>The name and identification of the contract is:</p> <p>SUPPLY AND INSTALLATION OF 2 NO 2MVA STANDBY GENERATORS AND ASSOCIATED WORKS AT JOMO KENYATTA INTERNATIONAL AIRPORT</p> <p>The Tender Number is:</p> <p>KAA/OT/JKIA/1534/2018-2019</p>

CLAUSE	
18.1	<p>Paragraph I;</p> <p>Replace words “subject to the provisions of clause 7.4, 18.2 and 18.3” with “subject to the provisions of clause 18.2, 18.3 and Appendix to Instructions to Tenderers”</p>
26.2	<p>The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be subject of correction, adjustment or amendment in any way by any person or entity as provided under section 82 of The Public Procurement and Asset Disposal Act, 2015.</p>
29	<p>Performance Security</p> <p>Performance security shall be valued at 10% of the total contract price, in the format provided and shall be in form of;</p> <ul style="list-style-type: none"> a) Cash or b) Banker’s cheque or c) A bank guarantee or d) Such insurance guarantee approved by the Authority. The insurance policy number must be provided or e) Letter of credit.

SECTION IV: EVALUATION CRITERIA

Based on the information contained in the Instructions to Tenderers and the appendix thereof, the following will be the evaluation criteria for determination of responsive tenderer leading to award of the contract:

I. Preliminary Evaluation

Tenderers, including all parties of a Joint Venture, shall **submit copies of all** the following documents with the tender:

- i. **Tender security** in the amount of **Kshs.2,000,000.00** and in the format required in clause 13.1 and 13.2 of the Instruction to Tenderers and the appendix thereof.
- ii. **Registration/Incorporation** of the tenderer (*in case of a joint venture, all parties shall submit*).
- iii. Proof of Registration as Original Equipment Manufacturer (OEM) representative.
- iv. In case of a Joint Venture one of the parties must be the OEM appointed representative. Proof of legal appointments (Scope of representation, certificate and MOU).
- v. Current valid **tax compliance certificate** which shall be valid at the time of tender opening (*in case of a joint venture, all parties shall submit*).
- vi. Duly completed **self-declaration form** (*in case of a joint venture, all parties shall submit*).
- vii. Duly completed **Form of Tender** in the format of the attached standard form.
- viii. Certificate of plant Installation for international firms and National Construction Authority registration in Specialist Contractors Category NCA1 and NCA2 for local firms - **Electrical Installations or Generating Plants** (*in case of a joint venture, either party shall submit/meet*)
- ix. CVs and copies of relevant academic certificates of **key personnel** for execution of the contract as described in the evaluation criteria below (*in case of Joint Venture, both parties combined should meet requirements*).
- x. Duly filled/signed **Certificate of Tenderer's Visit to the Site**
- xi. After-sales maintenance proposal for a period of five years after commissioning.

- xii. Technical brochures and documentation detailing the specification of equipment to be supplied and installed.

NB: FAILURE TO SUBMIT ANY OF THE ABOVE DOCUMENTS WILL LEAD TO AUTOMATIC DISQUALIFICATION FROM FURTHER EVALUATION

2. Technical Evaluation

Compliance with the following technical requirements:

I. Demonstration of past experience and performance.

Tenderers shall submit documents – *copies of contracts agreements, LPO, completion certificates or Interim completion certificates of not less than 70% complete* - to demonstrate past experience and past performance in implementation of projects of similar nature and provide details of current work on hand and other contractual commitments. Below are the minimum qualifying criteria::

I.1. General Experience:

- Tenderer shall demonstrate experience in Installation of Generating Plants projects, minimum 2No., in the role of contractor, subcontractor, or management contractor, each with value of at least **KES 100,000,000.00** within the past three consecutive years (2015, 2016, 2017 and 2018)
- Experience in Medium Voltage Installation works minimum 2No. Projects of Value KES 100,000,000.00 within the past three consecutive years (2015, 2016, 2017 and 2018).

I.2. Specific Experience:

Tenderer shall demonstrate experience in minimum 3 similar works in the role of contractor, subcontractor, or management contractor for the above named years, each with a minimum of the following work components;

- Supply and installation of a bank-up of at least two or multiple electrical generator sets with parallel operation providing combined load capacity of at least 2MVA
- Supply and installation of automatic electrical change-over systems
- Supply and installation of two or multiple electrical generator sets synchronization systems-
Experience in automation and SCADA system configuration minimum one project for the last 3yrs.
- Maintenance Plan for 5 years and tabulation of full life-cycle cost of the equipment.

(in case of Joint Venture, both parties combined should meet requirements).

NB: Documents submitted shall clearly indicate name of project, commencement and completion dates of the contracts, and names of contact persons.

2. Qualification and experience of key personnel.

The qualifications and experience of **key personnel** proposed for administration and execution of the Contract, both on and off site. Bidders shall submit **certified CV's** and copies of certificates of key personnel to be involved in the works. The minimum requirement is:- (

- a. **I No. Electrical engineer**, with at least ten (10) years' experience in installations of similar works – holding at least BSc in Electrical Engineering or equivalent & Valid Class 'A' ERC license.
- b. **I no. Electrical Systems Engineer-** Bsc Electrical engineering or equivalent with 5yrs experience in automation and SCADA system configuration-
- c. **I no. Mechanical engineer**, with at least ten (10) years' experience in installations of similar works – holding at least BSc in Mechanical Engineering or equivalent.
- d. **I no Electrical Technician**, with at least five (5) years' experience in installations of similar works – holding at least Diploma in Electrical Engineering or equivalent and Valid Class 'B' ERC license.
- e. **I no Mechanical Technician**, with at least five (5) years' experience in installations of similar works – holding at least Diploma in Mechanical Engineering Plant or equivalent.

3. Financial position and capability.

- (a) Minimum average annual turnover of at least **Kshs.100,000,000** as extracted from the audited accounts *(in case of joint venture all parties combined must meet requirement)-*
- (b) Tenderer shall demonstrate capacity to have liquidity of least **Kshs.50,000,000** by access to lines of credit, other financial resources such as current bank statements or letter from the bank specific to this tender *(In case of joint venture all parties combined must meet requirement)*

4. Compliance with technical specifications in accordance with Section V.

(Technical Specifications) of this tender document and as demonstrated in the provided brochures and specification documents-

NB: Bidders who are not substantially responsive to the above criteria will be disqualified and not evaluated further

5. Financial Evaluation

The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be subject of correction, adjustment or amendment in any way by any person or entity as provided under section 82 of The Public Procurement and Asset Disposal Act, 2015.

The tender will be awarded to the lowest evaluated bidder

Maintenance costs shall be quoted separately and **shall not** be included in the total price filled in the form of tender, and shall be total maintenance costs for a period of 5 years quoted annually and broken down into costs for each maintenance and on call attendance. These maintenance costs shall be applied in determination of life cycle costs during evaluation.

The bidders shall be ranked in accordance with the life cycle cost for 5 yrs.

NOTE;

- i. Bidders are hereby notified that due diligence shall be carried out on information provided above. Any false information provided will lead to automatic disqualification.
- ii. Bidders are required to serialize their bidding document from the first to the last page including all the attachments

SECTION IV: CONDITIONS OF CONTRACT (INCLUDING ERECTION ON SITE)

PART I – GENERAL CONDITIONS

PART I – General Conditions, shall be those forming Part I of the “Conditions of Contract for Electrical and Mechanical Works – Including Erection on Site, Third Edition 1987, re-printed 1988 with Editorial Amendments” prepared by the Federation Internationale des Ingenieurs – conseils (FIDIC). The Conditions are subject to variations and additions set out in Part II hereof entitled “Special Conditions”.

Note

- i. The standard text of the General Conditions of Contract must be retained intact to facilitate its reading and interpretation by tenderers. Any amendments and additions to the General Conditions, specific to a given Contract, should be introduced in the Special Conditions or in the Appendix to Form of Tender.
- ii. The Special Conditions take precedence over the General Conditions of Contract.
- iii. Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat
P. o. Box 86
1000 Lausanne 12
Switzerland
Fax: 41 21 653 5432
Telephone 41 21 653 5003

PREAMBLE TO GENERAL CONDITIONS

This Preamble must be completed in all cases referring to completed schedules where appropriate. When completed, this Preamble, the General Conditions, Specification, Employer's and Contractor's Drawings, Schedules and other documents can constitute a Contract on the basis of the General Conditions in Part II. If this is not what is required, Part II must also be completed.

SUB- CLAUSE	
1.1.1	<p><u>Commencement Date</u></p> <p>The date for commencement of the Works is: Date when letter of Notice to Commence is issued</p>
1.1.12	<p><u>The Employer</u></p> <p>The Employer is: Kenya Airports Authority</p>
1.1.15	<p><u>The Engineer</u></p> <p>The Engineer is: General Manager, Projects and Engineering Services (GM {P & ES}), Kenya Airports Authority</p>
1.1.35	<p><u>Time for Completion</u></p> <p>The Time for Completion is eight (8) calendar months from commencement Date and in accordance with the delivery schedule.</p>
1.6	<p><u>Costs, Overhead Charges and Profit</u></p> <p>The percentage to cover profit entitlement, where applicable, is 10%.</p>
5.1	<p><u>Ruling Language</u></p> <p>The version in English language (ruling language) shall prevail.</p>
5.2	<p><u>Day to Day Communications</u></p> <p>The language for day to day communications is English.</p>
12.1	<p><u>Programme to be furnished</u></p> <p>The Programme must be submitted in the form of critical path network, bar chart or equivalent.</p>

SUB- CLAUSE	
14.3	<p><u>Electricity, Water, Gas and Other Services</u></p> <p>Supplies on the Site are:</p> <ol style="list-style-type: none"> 1. Electricity, 2. Water. <p>Contractor shall be required to pay for employer's services they may expend on site. Where necessary, contractor shall provide approved metering devices for determination of services consumed and shall be required to obtain the services at points and sources shown by employer.</p>
14.4	<p><u>Employer's Equipment</u></p> <p>The following Employer's equipment is available for use by the Contractor under the Employer's operation: N/A</p>
18.3	<p><u>Working Hours</u></p> <p>The normal working hours are from 8.00 am to 5.00 pm local time, Monday to Friday except lunch time between 1.00 pm and 2.00 pm and on public holidays.</p> <p>Upon prior arrangements with employer, contractor may be allowed to work outside the hours mentioned.</p>
27.1	<p><u>Delay in Completion</u></p> <p>Failure to meet the Time for Completion entitles the Employer to reduction in Contract Price as follows:</p> <p>Amount for each day of delay: 0.05% Maximum: 10% of total contract sum</p>
27.2	<p><u>Prolonged delay</u></p> <p>Maximum amount recoverable from the Contractor by the Employer: Amount equal to total contract sum.</p>
33.1	<p><u>Terms of Payment</u></p> <p>In addition to the provisions under Clause 33, the terms of payment shall be:</p> <ul style="list-style-type: none"> - 60% LC on the imported equipment. With a bank guarantee of the same value.

SUB- CLAUSE	
	<ul style="list-style-type: none"> - 20% upon installation. - 20% commissioning. <p>A 10% retention shall be withheld on each payment.</p> <p>5% retention shall be released upon the installation and commissioning and a practical completion certificate issued.</p> <p>There shall be an Inspection and Acceptance process upon installation of the equipment. The report shall form the basis of payment for the 2nd certificate.</p> <p>The commissioning process shall involve running the equipment for 8hrs and provide the system readings which shall should conform to the manufacturer’s data.</p> <p>The manufacturer shall issue a certificate of commissioning after the complete testing and commissioning.</p>
35.1	Payment of Foreign Currency portion: Payments shall be in Kenya Shillings or US Dollars .
42.2	<p><u>Maximum Liability</u></p> <p>The maximum liability of the Contractor to the Employer shall be limited to the contract sum and shall cover all occurrences.</p>
43.1	<p><u>Insurance of Works</u></p> <p>The deductible limits in the insurance cover of the Works shall not exceed Kenya Shillings one million (KShs.1,000,000.00) equivalent.</p>
43.3	<p><u>Third Party Liability</u></p> <ul style="list-style-type: none"> i) Amend clause by adding “including property of the employer other than the works” after the words “physical property” ii) The amount of insurance against third party liability taken out by the Contractor shall not be less than: <ul style="list-style-type: none"> Kenya Shillings ten million (KShs.10,000,000.00) equivalent with deductible limits of Kenya Shillings two hundred thousand (KShs. 200,000.00).
46.3	<u>Payment on Termination for Employer’s Default</u>

SUB- CLAUSE	
	The additional amount payable by the Employer on termination shall not exceed: 10% of contract value.
47.1	<p><u>Labour, Materials and Transport</u></p> <p>The method of calculating adjustments for changes in costs shall be:</p> <ul style="list-style-type: none"> - Contract rates of prices for materials and transportation shall remain fixed throughout the contract duration. - Contract rates for Labour shall remain fixed unless the government of Kenya makes adjustments in labour prices. Any such change shall be considered at an equitable fraction.
49.2	<p><u>Notices to Employer and Engineer</u></p> <p>The address of the Employer for notices is:</p> <p style="padding-left: 40px;">Managing Director Kenya Airports Authority, 3rd floor, Kenya Airports Authority Headquarters, Airport North Road, P. O. Box 19001 – 00501 NAIROBI-KENYA,</p> <p>The address of the Engineer for notices is:</p> <p style="padding-left: 40px;">General Manager (P & ES) Kenya Airports Authority, 2nd floor, Kenya Airports Authority Headquarters, Airport North Road, P. O. Box 19001 – 00501 NAIROBI-KENYA,</p>
51.1	<p><u>Applicable Law</u></p> <p>The applicable law is the law of the republic of Kenya.</p>
51.2	<p><u>Procedural Law for Arbitration</u></p> <p>The procedural law for arbitration is:</p> <p>The rules of arbitration shall be those contained in the Arbitration Act of the Laws of Kenya.</p>
51.3	<p><u>Language and Place of Arbitration</u></p>

SUB- CLAUSE	
	The language of arbitration is English. The place of arbitration is Nairobi, Kenya.

PART II – SPECIAL CONDITIONS

(The Clauses referred to in Part II – Section A are those where the provision in the General Conditions (Part I) refer to an alternative solution to be stated in Part II. The provisions in the General Conditions will apply unless an alternative solution is given in Part II – Section A. The clauses in this section need therefore not be completed, but must be completed if alternative solutions to the relevant Part I provisions are necessary.)

SUB- CLAUSE	
1.1.1	<p>Conditions Precedent to Commencement</p> <p>The following financial and administrative requirements are conditions precedent to commencement:</p> <p>Signing of contract, submission of performance security.</p>
1.1.11	<p>Defects Liability Period</p> <p>The Defects Liability Period one (1) calendar year subject to Clause 30.4 of the Conditions of Contract.</p>
2.1	<p>Engineer’s Duties</p> <p>The Engineer requires the consent of the Employer through the Contract Implementation Team (CIT) before exercising the following duties:</p> <p>Matters that will lead to increase of value of the contract.</p>
6.6	<p>Operation and Maintenance Manuals</p> <p>Operation and Maintenance Manuals shall be in English language.</p>
10.1	<p>Performance Security</p> <p>The Contractor shall obtain a Performance Security at an amount equal to 10% equivalent of the contract sum as per the instructions to Tenderers.</p>
14.3	<p>Electricity, Water and Gas</p> <p>The following consumables may be provided by the Employer:</p> <p style="margin-left: 40px;">a) Electricity, b) Water.</p> <p>The consumables will be provided at the ruling consumer charges/rates at the relevant sites, plus administrative charges determined by the Employer.</p>

SUB- CLAUSE	
14.4	<p>Employer's Equipment</p> <p>The following items of Employer's Equipment will be provided free of charge by the Employer for the Contractor's use: none.</p>
14.7	<p>Authority for Access</p> <p>All persons seeking access to the site shall be in yellow or orange reflective jackets.</p> <p>The Employer shall provide personnel and vehicles security access passes to the restricted areas related to the project.</p> <p>The contractor will be required to pay for the car park charges within the airport.</p>
30.4	<p>Extension of Defects Liability Period</p> <p>In the event of suspension the Defects Liability Period shall not last more than 3 years after the date the Plant would have been delivered but for the suspension.</p>
31	<p>Price Variation</p> <p>Quantity variation for goods and services shall not exceed fifteen per cent of the original contract quantity;</p> <p>Quantity variation of works shall not exceed twenty per cent of the original contract quantity;</p> <p>The cumulative value of all contract variations shall not result in an increment of the total contract price by more than twenty-five per cent of the original contract price.</p> <p>However, any variation must in compliance to Section 139 of the Public Procurement and Asset Disposal Act, 2015.</p>
33.2	<p>Method of Application</p> <p>Application for payment shall be made as follows:</p> <p>As per Sub-clause 33.1 of Preamble to General Conditions.</p>
33.5	<p>Payment</p>

SUB- CLAUSE	
	<p>The period for payment shall be: Within 30 days after certification.</p> <p>The place for payment shall be: Kenya Airports Authority Headquarters.</p>
33.6	<p>Delayed Payment</p> <p>The interest rate for delayed payment is simple interest at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.</p>
33.8	<p>Payment by measurement</p> <p>The provisions for measurement are:</p> <p>Where any part of works is to be paid for according to the quantity of plant supplied or work done the following provisions shall apply:</p> <ol style="list-style-type: none"> I. Such part of works shall be measured from time to time by the Engineer or by the Contractor. No such measurement shall be made by either of them without the other being afforded a reasonable opportunity of attending and agreeing the measurements. The contractor shall at the request of the Engineer open up any part of the works which may have been covered up without his having been afforded a reasonable opportunity of measuring or agreeing to the measurements thereof and the contractor shall restore the same at his own cost. All measurements shall be made in accordance with the provisions of the specification respecting methods of measurement. <p>The sum payable in respect of such part of the works shall be ascertained according to the price or rate appropriate thereto as specified in the contract. If No appropriate price or rate has been specified, the price or rate shall be fair and reasonable price or rate taking into account any prices or rates that may be specified in the contract for similar plant or work.</p>
48.1	<p>Customs and Import Duties</p> <p>Contractor is required to factor in all import duties and taxes (including VAT and IDF charges) consequence of the importation of the Plant in his DDP offer in the tender.</p>
50.2	<p>Arbitration</p> <p>The rules of arbitration shall be those contained in the Arbitration Act of the Laws of Kenya.</p>

SECTION V: TECHNICAL SPECIFICATIONS

Table of Contents

1. SCOPE OF WORKS.....	42
2. EQUIPMENT ON SITE.....	42
3. REFERENCE STANDARDS.....	42
4. SUBMITTALS.....	43
4.1. SUBMITTALS DURING CONTRACT IMPLEMENTATION	43
4.2. SUBMITTALS WITH TENDER.....	44
4.3. SYSTEM DESCRIPTION	46
4.4. SITE CONDITIONS, DIESEL.....	47
4.5. SYSTEM PERFORMANCE GENERAL	47
4.6. QUALITY ASSURANCE.....	47
4.7. DELIVERY STORAGE AND HANDLING	51
4.8. COORDINATION.....	51
5. PRODUCTS.....	51
5.1. ENGINE.....	51
5.2. GENERATOR.....	55
5.3. GENERATOR SPECIFICATIONS.....	55
5.4. MOUNTING.....	59
6. DAY TANK	66
6.1. Codes and Standards	66
6.2. Design Requirements.....	66
6.3. Pump Operation.....	67
7. UNDERGROUND STORAGE TANK FOR FUEL.....	68
8. DIESEL LEVEL MEASUREMENT IN THE UNDERGROUND TANK.....	70
9. ELECTRICAL CABLING.....	71
10. EXECUTION	73
10.1. FACTORY INSPECTION.....	73
10.2. PRE-DELIVERY INSPECTION	73
10.3. PRE-DELIVERY TESTING.....	73
10.4. INSTALLATION	74
10.5. GROUNDING	74
10.6. PERSONNEL TRAINING	74
10.7. FACTORY TRAINING.....	74
10.8. SPARE PARTS.....	74

11. TESTING AND COMMISSIONING.....	75
12. SCHEDULE OF DEVIATIONS FROM TECHNICAL SPECIFICATION	77
13. SPARE PARTS.....	78

1. **SCOPE OF WORKS**

- A. The Contractor shall design, supply, transport/deliver, load, unload, install, erect, test and commission all materials and equipment and hand over in an acceptable condition as specified herein and as shown on the contract drawings.
- B. The emergency generators shall be in addition to existing generators that are synchronized.
- C. The works shall include:
 - a. Careful removal of existing 1.4MW standby generators including generator cooling towers and storage of the same in 2-40feet containers provided by contractor.
 - b. Carry out permanent repairs on all areas affected during removal of the generators on (a) above, preparatory works, painting of generator room interiors of the generator room and replace interior lighting
 - c. Supply and installation of:
 - i. 2no x 2MVA diesel engine-driven generator sets including generator mountings
 - ii. Generator exhaust system
 - iii. Generator cooling systems
 - iv. Fuel day tanks
 - v. Fuel underground storage tank
 - vi. Automatically controlled fuel pumping system
 - vii. Cable trays
 - viii. Power supply cabling
 - ix. Control systems for the generators
 - x. System control and switchgear
 - d. Training for operators and maintenance personnel

2. **EQUIPMENT ON SITE**

The following equipment is available on site;

- i. Ino Medium Voltage SM6 change over switchgear. The contractor shall supply and additional SM6 switchgear, similar to existing, and terminate the new generators on the switchgear.
- ii. Generator controllers - DEIF Model GC-IF and generator synchronization/paralleling Controller - DEIF Model GPC-3

It shall be the responsibility of the contractor to synchronize the new generators with the existing.

3. **REFERENCE STANDARDS**

- A. The equipment and plant shall be designed and tested in accordance with the latest standards to meet the technical requirements.

- B. The equipment and works shall, moreover, be produced and executed in conformity with national and international regulations and standards in force, and more specifically: -
- i. Kenya Standards - As published by Kenya Bureau of Standards
 - ii. International Electrotechnical Commission (IEC) Standards
 - iii. Overload power ratings in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271
 - iv. British Standards BS No. 5514 Reciprocating Internal Combustion Engines Performances
 - v. American Society of Mechanical Engineers Standards, American National Standards Institute Standards, hereinafter referred to as ASME/ANSI standards
 - vi. ISO 8528-5:2013 Reciprocating internal combustion engine driven alternating current generating sets -- Part 5: Generating sets: design and performance criteria arising out of the combination of a Reciprocating Internal Combustion (RIC) engine and an Alternating Current (a.c.) generator when operating as a unit

4. SUBMITTALS

The contractor shall submit detailed documentation that a prudent employer would customarily receive for equipment similar to the element or component of the Equipment in accordance with Good Industry Practice.

The technical brochures and specifications shall form the basis of evaluation for compliance with technical specifications.

4.1. SUBMITTALS DURING CONTRACT IMPLEMENTATION

Copies of original of Submittals during Contract Implementation shall be done electronically and Originals of the Submittals shall be promptly delivered to the employer for review and acceptance or rejection. If the employer rejects or comments on the submittals, the Contractor shall promptly amend as appropriate. These submittals shall not form part of tender evaluation.

These include and not limited to;

- A. Shop drawings after notice to commence.
- B. Any other additional drawings or/and documents, including Calculations, that the employer may require pertaining to specific details of the equipment/works in order to confirm or clarify details of the design/works, and the Contractor will provide such Drawings or/and Documents without delay so as not to adversely affect the progress of the Work.
- C. Implementation plan after notice to commence.
- D. Equipment manuals
- E. Risk and Safety Management Plan
- F. Quality, Inspection and Testing reports
- G. Assembly/Installation Procedures
- H. Commissioning Procedures
- I. Operations and Maintenance Procedures and Manuals

- J. Routine testing procedures
- K. Major Overhaul, Repair and Replacement Procedures
- L. Training Materials
- M. Commissioning Data, Test Results and Reports
- N. Final Drawings and Explanatory Documents

4.2. **SUBMITTALS WITH TENDER**

The submittals listed below shall be submitted with tender and shall form part of tender evaluation;

4.2.1 Product Data: Manufacturer produced generator set documentation and specification or data sheets identifying make and model of engine and generator, and including relevant component design and performance data.

i. **Engine**

1. Engine manufacturer
2. Model
3. Type, aspiration, displacement, compression ratio, and combustion cycle.
4. Bore, stroke, displacement, and number of cylinders.
5. Nominal operating speed
6. Engine lubricating oil capacity.
7. Engine coolant capacity without radiator.
8. Engine coolant capacity with radiator.
9. Coolant pump external resistance (maximum)
10. Coolant pump flow at maximum resistance
11. Prime gross power (PRP) (KW)
12. Maximum gross power (limited-Time running Power {LTP}) (KW)
13. Emergency standby power (ESP) (KW)

ii. **Alternator**

1. Manufacturer
2. Model
3. Insulation class - Number of leads - Weight, total
4. Voltage tolerance
5. Efficiency at @ 75% load at rated voltage:
6. Efficiency at 0.8 power factor @ 50% load PRP
7. Efficiency at 0.8 power factor @ 75% load PRP
8. Efficiency at 0.8 power factor @ 100% load PRP
9. Time constants, short circuit transient (T'D)
10. Time constants, armature short circuit (TA)
11. Reactance, sub transient - direct axis (X''D)
12. Reactance, transient - saturated (X'D)
13. Reactance, synchronous - direct axis (XD)
14. Reactance, negative sequence (X2)
15. Reactance, zero sequence (XO)
16. Fault current, 3 phase symmetrical
17. Decrement curve

iii. Radiator

1. Model
2. Type
3. Fan drive ratio
4. Coolant capacity, radiator
5. Coolant capacity, radiator and engine - Weight, dry
6. Weight Wet

iv. Genset Equipment

- i. Manufacturers
- ii. Battery capacity
- iii. Dimensions: length, width, height
- iv. Weight, dry
- v. Weight, wet
- vi. Specific fuel consumption at 0.8 power factor @ 50% PRP
- vii. Specific fuel consumption at 0.8 power factor @ 75% PRP
- viii. Specific fuel consumption at 0.8 power factor @ 100% PRP
- ix. Noise pressure level @ 7 metres

Performance - based on SAE J1349 standard conditions of 100 kPa (29.61 in Hg) and 25°C; also at conditions of ISO3046/I.

Din 6271 and BS 5514. Fuel rates are based on ISO 3046 and on fuel oil of 35 degrees API (16°C) gravity having a LHV of 42780 kJ/kg (18,390 Btu/lb) when used at 29°C and weighing 838.9 g/l.

Power rating at 0.8 power factor

MVA rating

Fuel consumption at standard conditions for: 50% load, 75% load, 100% load

Combustion air inlet flow rate

Exhaust gas, flow rate

Stack temperature

Exhaust system backpressure (maximum)

Heat rejection to: coolant, after cooler, exhaust, atmosphere from engine, atmosphere from generator

Transient response of frequency and voltage for the generator set and, if units are operating in parallel, for the total system when imposing block load changes of:

- 0 - 25%
- 0 - 50%
- 0 - 75%
- 0 - 100%
- 100 - 0%
- 75 - 0%
- 50 - 0%
- 25 - 0%

Auxiliary Equipment - Specification or data sheets, including switchgear, transfer switch, vibration isolators, and day tank.

4.2.2 Shop Drawings: General dimensions Drawings showing overall generator set measurements, mounting location, and interconnect point for load leads, fuel, exhaust, cooling and drain lines.

Wiring diagrams, wiring diagrams, schematics and control panel outline Drawings published by the Manufacturer in Joint Industrial Council (DC) format for controls and switchgear showing interconnected points and logic diagrams for use by Contractor and Owner.

All installation Drawings and wiring diagrams for the generator set, controls, and switchgear must conform to a common format.

Service - location and description of Supplier's parts and service facilities including parts inventory and number of qualified generator set service personnel.

4.2.3 Compliance with Building Automation System Requirements.

The control module shall be provided with a communications module to communicate directly to the BAS on a non-proprietary communications link such as TCP/IP, Modbus, Bacnet etc. The integration into the system shall be proven during commissioning.

4.3. SYSTEM DESCRIPTION

The electric power generating system shall have a capability of 1800 kW, 2250 Kva stand-by-LTP (1600 kW, 2000 kVA prime power-PRP) 0.80 power factor, 11000 Volts, Star (Wye) connected, three (3) phase, 50 Hertz. This power shall be applied for standby operation for the whole project requirements and located in the power plant.

The system shall consist of generator set(s), which include all controls, protection, wiring, and accessories for automatic start-stop operation.

The generator set(s) shall include the capability of automatically controlling generator set operation. After starting, the units shall attain rated speed and voltage, and accept rated load. Generator set speed shall be controlled by the engine governor, while generator output voltage regulation shall be a function of the generator automatic voltage regulator. Manual adjustment of generator speed and voltage shall be provided.

The generator set shall automatically start, attain rated speed and voltage, and accept share load. Starting and stopping sequence can be initiated manually or automatically by closing and opening of a contact.

The set shall immediately shutdown in the event of over speed, low oil pressure, high water temperature and over crank. Cause of shutdown shall be indicated by a light annunciator. System logic shall prevent restart until fault is cleared.

There shall be a provision for manual shutdown in the event of an emergency.

Each generator set shall be capable of paralleling manually and automatically to the system bus. Appropriate monitors and safety devices shall be included to provide system protection while paralleling and operating on the system bus.

Automatic operation shall include control devices to compare and adjust oncoming units to frequency and phase of system bus, sense matching within acceptable limits, and signal closure of the circuit breaker. Control circuits shall prevent more than one (1) circuit breaker from simultaneously closing onto a dead bus.

Load sensing circuits shall compare system requirements with on-bus generator capacity. Generator sets shall automatically be added and removed from the bus according to system load demand.

Under-frequency sensing of system bus shall be an indication of overload. Load shed circuits shall initiate removal of selected loads from system bus.

The full status and alarm shall be monitored by the Building Automation System (BAS).

4.4. SITE CONDITIONS, DIESEL

The operating environment of the power generating system shall be:

Altitude	1700m	
Engine room temperature	maximum	35°C
Outside temperature,	minimum	8°C
Engine jacket water glycol	0%	
Installation description	large engine room	
Fuel type	diesel	
Low heating value (LHV	42,780 MJ/cu.m	
Cooling system type	remote type	

4.5. SYSTEM PERFORMANCE GENERAL

The power generating system shall conform to the following performance criteria:

4.5.1 Rating: Engine brake horsepower shall be sufficient to deliver full rated generator set kW/kVA when operated at rated rpm and equipped with all engine-mounted parasitic and external loads such as radiator fans and power generators.

The rating shall be based on SAE J 1349 conditions of 100 kPa (29.61 in Hg) and 25°C. The rating shall also apply at ISO 3046/1, DIN 6271 and BS 5514 Standard Conditions.

4.5.2 Diesel engine shall be able to deliver rated power when operating on NO.2 diesel fuel having 35 degree API 16°C specific gravity.

Diesel fuel rates shall be based on fuel having a low heating value (LHV) of 42780 kJ/kg (18,390 Btu/lb) when used at 29°C (850°F) and weighing 838.9 g/l.

Start Time and Load Acceptance: Engine shall start, achieve rated voltage and frequency, and be capable of accepting load within ten (10) seconds when properly equipped and maintained.

Block Load Acceptance: Transient response shall conform to ISO 8528 requirements.

4.6. QUALITY ASSURANCE

4.6.1 Manufacturer Product: The complete power generation system, including engine, generator shall be the product of one (1) Manufacturer who shall be regularly engaged in the production of complete generating systems for at least twenty (20) years. All components shall be designed to achieve optimum physical and performance compatibility and prototype tested to prove integrated design capability. The complete system shall be factory fabricated, assembled, and production tested.

The responsibility for performance to this specification shall not be divided among individual sub-contractors of manufacturers, but must be assumed solely by the Contractor. This includes generating system design, manufacture, test, and having a local Supplier responsible for service, parts, and warranty for the total system.

4.6.2 Tests: The system Manufacturer shall perform post production tests on the generator set supplied. A certified report of these tests shall be available when requested at the time of the generator set order.

Each engine, generator, and generator set shall be subjected production performance tests and quality controls to ensure reliable operation. These tests and controls shall include but not be limited to:

Specific observances of engine blow by, slobber, combustion gas leaks, inlet air leaks, excessive vibration, and unusual noise.

Special oil additive for specific leak detection.

Fuel system setting confirmation which shall not be altered to rectify non-conformance to established performance specifications.

Retest after any change affecting airflow through the engine, fuel injected into the engine, engine combustion, or any reassembly affects mechanical integrity.

Periodic extended tests to confirm baseline data.

Recording of:

Engine

- Corrected power
- Full load speed
- Full load torque Corrected fuel rate
- Corrected specific fuel consumption Turbo boost - Inlet air restriction
- High idle speed
- Low idle speed
- Jacket water temperature
- Jacket water in-out temperature differential
- Separate circuit after cooler water temperature
- Fuel pressure
- Oil pressure
- Fuel system setting
- Response (rpm-time) for fun load removal Timing

- Barometric pressure Water vapour pressure Inlet air temperature
- Fuel density

Generator

- High potential test, before and after load runs - Voltage gain range at load
- Voltage level range
- Regulation adjustment at 0.8 PF
- Voltage drop range, when applicable Circulating current between phases Voltage balance between phases
- Residual voltage

Torsional and linear vibration analysis of generator set

Individual testing of major components

Individual balancing and weight control of rotating! reciprocating components.

4.6.3 Equipment Alternatives: Data for substitute equipment shall include the following:

- Plan Drawing: Verification that substitutes equipment shall fit into the space allocated and allow for removal and service.
- Air flow requirements: Provision for combustion, ventilating, and radiator cooling air.
- Connections: Wiring and piping diagrams describing interconnect changes.
- Load Study: Complete load review to confirm that generating equipment operates satisfactorily and complies to original specification during all phases of operation, including motor starting and transient loading capabilities.
- Specification: Specification sheets and support literature to show that alternate equipment is in compliance with all specifications.
- Certification: List of projects using similar equipment for the last five (5) years.
- Exceptions: A complete account of all deviations from these specifications.

4.6.4 Service and Warranty: The Manufacturer shall have a local authorized Dealer who can provide factory trained servicemen, the required stock of replacement parts, technical assistance, and warranty administration.

The Manufacturer's authorized Dealer shall be capable of administering the Manufacturer's and Dealer's warranty for all components supplied.

The Manufacturer's and Dealer's extended warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labour, reasonable travel expense necessary for repairs at the jobsite, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Applicable deductible costs shall be specified in the Manufacturer's warranty. Running hours shall not be a limiting factor for the system warranty by either the Manufacturer or servicing Dealer. Submittals received without written warranties as specified shall be rejected in their entirety.

The generator set Supplier shall have factory trained service representatives and tooling necessary to install, test, maintain, and repair all provided equipment.

The generator set Supplier shall have sufficient parts inventory to maintain over the counter availability of at least 90% of any required parts.

The generator set Supplier shall provide a scheduled oil sampling service to monitor engine condition on an ongoing basis. The sampling method shall be of the atomic absorption spectrophotometry method and be accurate to within a fraction of one (1) part per million for the following elements:

- Iron
- Chromium
- Copper
- Aluminium
- Silicon
- Lead
- Water
- Fuel
- Antifreeze

The oil samples shall be analyzed at an approved laboratory trained personnel. Immediate notification of critical results shall be provided to the Engineer.

4.6.5 Test Reports: Copies of the manufacturer's certified shop test record of the complete engine driven generator. The engine-generator log test sheets and a performance review report shall be signed by the engine tester and certified by the manufacturer. The report shall include brief outlines of all test procedures and shall compare actual test results to the requirements of these specifications by means of calculations, graphs, or charts. Submit name and address of nearest factory authorized service and parts facility.

4.6.6 Service Manuals and Parts Books: The system Manufacturer's shall furnish five (5) copies of the manuals and books listed below for each unit under this contract.

- Operating Instructions - with description and illustration of all switchgear controls and indicators and engine and generator controls.
- Parts Books - that illustrates and list all assemblies, subassemblies and components, except standard fastening hardware (nuts, bolts, washers, etc.).
- Preventative Maintenance Instructions - on the complete system that cover daily, weekly, monthly, biannual, and annual maintenance requirements and include a complete lubrication chart.
- Routine Test Procedures - for all electronic and electrical circuits and for the main AC generator.
- Troubleshooting Chart - covering the complete generator set showing description of trouble, probable cause, and suggested remedy.
- Recommended Spare Parts List - showing all consumables anticipated to be required during routine maintenance and test.
- Wiring Diagrams and Schematics - showing function of all electrical components.

The manufacturer shall ensure All manuals and books described above shall be contained in rigid plastic pouches. Soft copies of the documents shall also be provided in flash disks.

4.7. DELIVERY STORAGE AND HANDLING

4.7.1 Storage: The Contractor shall acknowledge storage conditions at the time of submitting his Tender. If the equipment 'Will not be operational within 90 days after manufacture, the manufacturer shall crate and prepare the equipment for export transportation and long-term storage. Precautionary measures for prolonged storage shall be provided by the manufacturer at the factory. The Contractor shall be responsible for storage and maintenance of the protective measures as recommended and instructed by the manufacturer while stored at the storage site. The manufacturer's warranty on units held in prolonged storage exceeding three months shall be covered by special agreement reflecting the storage conditions.

4.7.2 Packaging: In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be similar to export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

Instructions for the servicing of equipment while in long-term or prolonged storage shall accompany each item of equipment. Advisement of enclosed instructions with each package shall be noted on the exterior of the package in both Arabic and English.

4.8. COORDINATION

All equipment specified in this section shall be furnished through a single manufacturer who shall be responsible for the design, manufacture coordination, and proper installation and operation of the entire system.

5. PRODUCTS

5.1. ENGINE

The engine shall be a stationary, liquid cooled, 1500 rpm, four-cycle design, vertical in-line or V -type, with dry exhaust manifolds. It shall have sixteen (16) cylinders with minimum displacement of 69.0 liters. (Main generator engines at power plant).

5.1.1 Engine Equipment: The engine shall be equipped with air filters, fuel filters and pressure gauge, lubricating oil cooler, filters, and pressure gauge, fuel pump, water pump and temperature gauge, service hour meter, flywheel, and flywheel housing when applicable.

5.1.2 Structural/Metallurgy: The design of the basic engine shall provide for maximum structural integrity to extend service life. Materials used in the engine shall incorporate the highest level of proven metallurgical and manufacturing technology.

Block shall be one (1) piece design and cast of high tensile strength iron. Counter boring for cylinder liners shall not be permitted.

Crankshaft shall be a one (1) piece forging with regrindable wear surfaces hardened through heat treat methods.

Cylinder wear surfaces shall be induction hardened over their entire length.

Main and rod bearings shall consist of aluminium bonded by copper to a steel backing. The wear surface shall be coated with a lead-tin overlay and the bearing covered by a tin flashing.

Connecting rods shall be high strength steel with tapered pin bore. Drilled passages to supply oil from rod bearing for piston cooling and lubricating oil shall not be permitted.

Pistons shall be a lightweight aluminium alloy which is elliptically ground across the skirt and tapered from crown to skirt. For medium and high speed engines, compression rings in aluminium bodies shall have integral cast iron ring bands with keystone sectioned top rings. Compression rings in steel piston crowns shall seat in hardened steel grooves. Oil jets shall supply piston cooling and lubricating oil.

Valves shall be hard-faced with replaceable inserts.

5.1.3 Lubrication System: The lubrication oil pump shall be a positive displacement type that is integral with the engine and gear driven from the engine gear train. The system shall incorporate full flow filtration with bypass valve to continue lubrication in the event of filter clogging.

The bypass valve must be integral with the engine filter base or replaceable. Systems where bypass valves are located in the replaceable oil filter are not acceptable. Pistons shall be oil cooled by continuous jet spray to the underside or inside of the crown and piston pin.

5.1.4 Diesel Fuel System: The fuel system shall be integral with the engine. It shall consist of fuel filter, transfer pump, injection pumps, lines, and nozzles. The transfer pump shall deliver fuel under low pressure to individual injection pumps - one (1) for each cylinder.

The injection pumps shall be driven from the camshaft and simultaneously controlled by a rack and pinion assembly that is hydraulically actuated by signals from the engine governor. The pumps shall be of a variable displacement type to alter the volume of fuel delivered to the spray nozzles according to demand.

The nozzles shall inject fuel directly into the cylinder in the optimum spray pattern for efficient combustion.

- **Large Engine System:** A unit fuel injector shall be mounted in each cylinder head, with external feeder lines requiring less than five (5) bar (75 psi) fuel pressure. Individual control racks for each cylinder shall permit precise injection timing.
- **Primary Fuel Filter:** In addition to the standard filter, the fuel system shall include a primary fuel filter between the fuel tank and transfer pump to screen large contaminants.
- **Fuel Pumping Pump:** A manual fuel priming pump shall facilitate priming and bleeding air from the system.
- **Fuel Lines:** Flexible fuel lines between engine and fuel supply shall be installed to isolate vibration.

- **Fuels System Maintenance:** The fuel transfer pump, injection pumps) rack and pinion assembly) and timing mechanism shall be maintenance and adjustment tree for the life of the equipment. The fuel filter shall not require changing more frequently than once per year or every 250 hours, whichever comes first. Fuel water separators (if equipped) shall not require draining more frequently than once per week.

5.1.5 Governor: The engine governor shall control engine speed and transient load response within commercial and ISO 85258 tolerances. It shall be selected, installed, and tested by the generator set Manufacturer.

The engine governor shall be electronic load sharing and speed control with electro-hydraulic actuator.

Speed drop shall be externally adjustable from 0 (isochronous) to 10% from no load to full rated load. Steady state frequency regulation shall be $\pm 0.25\%$. It shall be capable of sharing load within five percent (5%) when paralleled with similarly equipped engines. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. The governor shall incorporate provisions for limiting fuel during start-up, and include capability for actuator compensation adjustment. Protection from voltage spikes and reverse polarity shall be included.

5.1.6 Cooling System: The engine jacket water cooling system shall be a closed circuit design with provision for filling, expansion, and de-aeration. The cooling pump shall be driven by the engine. Auxiliary coolant pumps required for heat exchangers or separate circuit after cooling shall also be engine driven. The cooling system shall tolerate at least 172 kPa (25 psi) static head. Coolant temperature shall be internally regulated to disconnect external cooling systems until operating temperature is achieved.

In power plant, engine coolant heat shall be discharged to the atmosphere by means of a horizontal mounted remote radiator located no more than fifteen (15) meters above the engine water pumps. The radiator and plumbing shall be provided by the Contractor and shall be installed to avoid air traps. Pipe braces shall be installed at all pipe bends and piping jointed by clamps. The Contractor shall also provide and install an auxiliary circuit where necessary to maintain less than 172 kPa (25 psi) on the engine water pumps.

The generator set Supplier shall provide jacket water pump performance data to equate flow against external resistance. If required, the Contractor shall provide a booster pump in the return line to the engine.

5.1.7 Inlet Air System: The engine air cleaner shall be engine mounted with dry element requiring replacement no more frequently than 250 operating hours or once each year. If external ducting is required, maximum restriction to the combustion air inlet shall be 6.7 kPa with air flow of 144.2 cu m/min.

The turbocharger shall be of the axial turbine type driven by engine exhaust gases and directed - connected to a compressor supplying engine combustion air.

After cooler core air surfaces shall be coated with a corrosion inhibitor to minimize oxidation.

5.1.8 Exhaust System: The engine exhaust system shall be installed to discharge combustion gases quickly and silently with minimum restriction. System including silencer shall be designed for minimum restriction, and in no case shall backpressure exceed 6.7 kPa.

Heavy walled piping such as Schedule 40 is preferred, with radii of 90° bends at least one and half (1 ½) times the pipe diameter.

Piping shall be supported and braced to prevent weight or thermal growth being transferred to the engine and flexible expansion fittings provided to accommodate thermal growth. Support dampers and springs shall be included where necessary to isolate vibration.

Long runs of pipe shall be pitched away from the engine and water traps installed at the lowest point. Exhaust stacks shall be extended to avoid nuisance fumes and odours, and outlets cut at 45° to minimize noise.

- **Exhaust Noise Control:** The exhaust silencer shall be sized and supplied by the engine Supplier. It shall be mounted near the engine to minimize noise and condensation, and pitched away from the engine. A provision for draining moisture shall be included.
- **Silencer Critical:** The silencer shall provide extreme noise attenuation for environments with low background noise and slight noise emissions would be objectionable (Only for power plant generators).
- **Noise Level:** Exhaust noise of any engine shall not exceed 85 dBA when measured seven (7) meters perpendicular to the exhaust outlet.
- **Exhaust Thimble:** An exhaust thimble shall be installed at the point where the exhaust pipe penetrates insulation and shall be vented with eight (8), one (1) inch holes at one (1) end only. It shall be constructed of stainless steel, include high temperature insulation, and conform to the recommendations of the National Fire Protection Association bulletin NFPA-110.

5.1.9 Wiring and Conduit: Engine and generator control wiring shall be multi-strand annealed copper conductors encased by cross linked polyethylene insulation resistant to heat, abrasion, oil, water, antifreeze, and diesel fuel. Wiring shall be suitable for continuous use at 120°C with insulation not brittle at -5°C. Each cable shall be heat stamped throughout the entire length to identify the cable's origin and termination. Cables shall be enclosed in nylon flexible conduit which is slotted to allow easy access and moisture to escape. Reusable bulkhead fittings shall attach the conduit to generator set mounted junction boxes.

5.1.10 Electric Starting System: The engine starting system shall include 24V DC starting motor(s), starter relay, and automatic reset circuit breaker to protect against butt engagement. Batteries shall be maintenance free, lead acid type mounted near the starting motor. A corrosion resistant or coated steel battery rack shall be provided for mounting. Required cables shall be furnished and sized to satisfy circuit requirements. The system shall be capable of starting a properly equipped engine within ten (10) seconds -at ambient temperatures greater than 22°C.

- **Jacket Water Heater:** Jacket water heater(s) shall be provided to maintain coolant temperature of 32°C while the engine is idle. Heaters shall accept 120, 240 or 480 V AC single phase power and include adjustable thermostats.

- **Batteries:** Batteries for starting and control shall be selected and supplied by the generator set Manufacturer. They shall be a heavy duty SLI lead acid type with thru-partition connectors, and housed in a hard rubber or polypropylene case with provision for venting.

Starting batteries shall be rated 24 V DC with a minimum of 200 Amperelhour. Sizing shall consider specific application requirements of engine oil viscosity, ambient starting temperature, control voltage, overcharging and vibration.

Batteries shall be located as close to the starting motor as practical, away from spark sources, and permit easy inspection and maintenance.

Battery warranty shall be the responsibility of the generator set manufacturer.

- **Alternator:** An engine mounted belt driven battery charging alternator shall be installed with an automatic voltage regulator. It shall be suitable for heavy duty applications with a rating of 24 V.

The manufacturer shall proof compliance with all the specifications in this section.

5.2. **GENERATOR**

The generator shall be rated for standby service at 2000 kVA, 0.8 PF, 11kV, three phase, 6 wire, 50 Hz, 1500 rpm for power plant generator sets.

The generator shall be capable of withstanding a three (3) phase load of 300% rated current for ten (10) seconds, and sustaining 150% of continuous load current for two (2) minutes with field set for normal rated load excitation.

It shall exhibit less than 5% wave form deviation at no load.

Motor starting capability shall be established with the following considerations:

- Motor horsepower is to be based on 13.3 Amp/Hp, 230 V, locked rotor
- Motor may be free running or locked rotor
- Motor windings to be at room temperature
- Generator to be driven by a synchronous driver

Generator is to be hot, equivalent to the stabilized temperature band between the generator's 75% and 100% continuous.

Generator efficiencies shall be calculated according to IEC 34.2 Section 4. with all losses corrected to 115°C.

The manufacturer shall proof compliance with all the specifications in this section.

5.3. **GENERATOR SPECIFICATIONS**

The generator shall be designed, manufactured and identified according to the following specifications:

Type	Brushless
Number of Leads	Six (6)
Insulation Class	H
Connection	Wye
Construction	Single Bearing
Rated Prime Power	1600kW
Rated Prime kilo- volt-Amps	2000kVA
Rated Prime Voltage	11000V
Heat Rise	120°C

5.3.1 Structure: The generator shall be closed coupled, drip proof and guarded, constructed to NEMA 1 and IP 22 standards, single bearing, salient pole revolving field, synchronous type with amortisseur windings in the pole faces of the rotating field.

5.3.2 Mechanical Design - Single Bearing: The generator housing shall be one (1) piece and mount directly to the engine flywheel housing without bolted adaptors. Engine torque shall be transmitted through flexible steel plates to the generator rotor. The generator ventilating fan shall mount to the engine flywheel and act as a pressure plate to secure the flexible plates.

The rotor assembly shall demonstrate 150% over speed capability at 170°C for two (2) hours. Rotor dynamic, two (2) plane balance shall not exceed 0.05 mm peak to peak amplitude at operating speed. All rotating components shall be secured with SAE Grade 8 hardware.

5.3.3 Windings: Thermal Class 200 magnet wire as described by NEMA Magnet Wire Standard MW 1000, Section MW 35-C, shall be used for rotor and stator windings. The windings shall consist of copper magnet wire coated with an underlay of polyester (amide) (imide) resins and a superimposed heavy coat of polyamideimide resins. All winding insulation materials shall be Class H in accordance with BS and IEEE standards. No materials shall be used which support fungus growth, and shall be impervious to oil, dirt, and fumes encountered in diesel and natural gas engine operating.

The revolving field coils shall be precision wet layer wound with epoxy based material applied to each layer of magnet wire. Stator shall have at least two (2) dips and bakes using Class H impregnating varnish. Basic lightning impulse insulation level (BIL) shall not be less than 75kV. Windings shall be tested at 75000 Volts AC.

5.3.4 Operating Environment: The generator shall be designed to operate in a sheltered drip-proof environment.

The self-excited system shall derive excitation current from the generator output. The AC power shall be converted and controlled by silicon controlled rectifiers.

5.3.5 Voltage Regulator: The automatic voltage regulator shall maintain generator output voltage by controlling the current applied to the exciter field of the generator.

The regulator shall be a totally solid state design which includes electronic voltage build-up and over-current protection. It shall incorporate 1: 1 Volts per Hertz characteristics with the regulated voltage a linear function proportional to frequency over a 30 to 70 Hz range.

The regulator shall be suitable for mounting within or external to the generator assembly, and have provision for remote voltage level control.

As installed, the voltage regulator shall meet the applicable sections of the following standards:

- Canadian Standards Association (CSA)
- International Electro-technical Commission (IEC)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electrical Manufacturers Association (NEMA)

Generator output voltage maintained within \pm one percent (1%) of rated value for any load variation between no load and full load.

Generator output voltage drift no more than \pm half percent ($\frac{1}{2}$ %) of rated value at constant temperature.

Generator output voltage drift no more than + one percent (1%) of rated value within a 40° change over ambient temperature range of -40°C to 70°C.

Response time less than 20 milliseconds

Voltage build-up with generator output as low as 6 Volts. At full throttle engine starting, output voltage overshoot no more than five percent (5%) of its rated value, with respect to the Volts/Hz curve.

Power dissipation 30 Watts.

Electronic Interference/Radio Frequency Interference (EMI/RFI) suppressed to commercial standards.

The regulator shall include the following features:

- Voltage level rheostat to provide generator output voltage adjustment of 25% to +10% of nominal.
- Gain adjustment to provide output voltage compensation for changes in load or frequency.
- Reactive droop control to allow paralleling without interconnect wiring between generators, with eight percent (8%) minimum drop at full load and 0.8 PF.

Protection against loss of voltage sensing and long term over current conditions. The over current protection function shall automatically reset when the regulator is de-energized. The regulator shall not be damaged or result in unsafe operation when subjected to open or shorted input due to sensing loss, or a short to ground or adjustment conductor. Fast blow fuses shall be included in two (2) of the sensing leads to fully protect the regulator.

The regulator module sealed in a waterproof and airtight shock resistant plastic housing and shall withstand:

- Operating temperatures between -40° to 70°C.

- Shock tolerance to 20 g's.
- Vibration of 4.5 g's (peak) between frequencies of 18 to 2000 Hz in three (3) perpendicular planes, and mechanical shock of 15 g's in all three (3) planes.
- Salt spray resistant as described by MIL STD - 810 C, Method 509.1 and ASTM-B117.
- Pressure sealed to withstand 35 kPa.

The regulator shall include a reactive droop network to allow paralleling with other generators. The network shall consist of current transformer rheostat, and control Circuit which shall provide 8% minimum droop at full load and 0.8 PF.

The manufacturer shall proof compliance with all the specifications in this section 5.3.

5.4. MOUNTING

The engine and generator shall be assembled to a common base. The generator set base shall be designed and built by the engine-generator Manufacturer to resist deflection, maintain alignment, and minimize resonant linear vibration.

5.4.1 Mounting Base-Structural Steel. Wide: The base shall be of heavy duty steel construction with rolled "I" beam structural members reinforced to maintain engine and generator alignment during skidding, lifting and genset operation. Structural side members shall have bottom mounting holes and incorporate welded end caps to enhance skid ability. It shall have provision for single point lifting arch and enclosure.

5.4.2 Isolator-Spring Type: Steel spring isolators shall be installed between the generator set base and the mounting surface. The isolators shall bolt to the base, and have a waffled or ribbed pad on their bottom surface. The pads shall be resistant to heat and age, and impervious to oil, water, antifreezes, diesel fuel, and cleaning compounds.

AUTOMATIC START STOP CONTROL

The control panel shall be shock mounted on the generator and have the capability to face either side or the rear of the generator. The 24 Volt DC system shall incorporate energize to run logic and include.

5.5.1 Control: Generator voltage level rheostat and ammeter/ voltmeter phase selector switch shall be mounted on the panel door.

The engine start-stop switch shall be door mounted and include positions for off/reset, manual, automatic, and stop.

5.5.2 Shutdown/Annunciation: The generator set shall shut down and individual red lights shall signal operational faults of high water temperature. low oil pressure, over speed, and over crank.

5.5.3 Monitor: Monitoring devices shall include AC voltmeter. AC ammeter, ammeter/voltmeter phase select switch, frequency meter, electric hour meter, oil pressure gauge, and water temperature gauge.

5.5.4 Safety Devices: ISO red emergency stop pushbutton shall be provided and all controls, annunciation., and monitors labelled with ISO symbols.

- **Cycle Cranking:** A cycle crank timer shall provide five (5) 10 seconds cranking periods separated by 10 second rest periods.
- **Engine Cool down:** A cool down timer shall provide an adjustable 0.30 minute engine running period before shut down after removal of load.
- **Alarm Module:** NFPA-99 requirements for the alarm panel shall be satisfied by a 24 Volt DC alarm module mounted in the panel and including red indicating lights and silence able alarm horn to annunciate alarm conditions for high and low coolant temperature, low oil pressure, low DC voltage, and system not in automatic. Low fuel level alarm and two (2) spare LEDs shall be available to accept remote switch inputs.

5.5.5 Controls-Generator Set Mounted: The control panel shall be mounted on the generator set and incorporate 100% solid state microprocessor based control circuitry, sealed dust-tight, water-tight modular components with metal housings, and digital instrumentation. The panel shall be labelled with ISO symbols and comply with IEC 144, IP 22, and NEMA 12 for external environmental resistance, and IF 44 and NEMA 12 for resistance of the internal sealed modules.

The status shall be fully monitored by the Building Automation System (BAS).

The panel shall be labelled with ISO symbols and include the following equipment:

- **Generator:** AC Output Metering Devices: Back-lit LCD displays for Volts, Hertz, and Amps in a single environmentally sealed module. Numeral height shall be 13 mm with not less than 0.5% accuracy true RMS throughout a temperature range of -40 to +70°C. Distorted generator output voltage waveform of a crest factor less than five (5) shall not affect metering accuracy.
- **Engine Monitoring Devices:** Back-lit LCD to sequentially rotate display of operating hours, engine RPM, battery DC Volts, oil pressure, and jacket water temperature. A momentary switch shall be provided to continuously display a selected operating parameter. The display shall annunciate fault shutdowns, cycle programming, and diagnostic codes for troubleshooting. Engine monitoring signals provided by engine mounted lubricating oil pressure and coolant temperature transducers shall be communicated over a serial data link through a Data Sending Unit (DSU) to the panel control module. The safety logic shall shut the engine down if the serial data link is lost.
- **Controls:** Generator voltage level rheostat and ammeter] voltmeter phase selector switch shall be mounted on the panel door. The engine start-stop switch shall be door mounted and include positions for off/reset, run/start, stop, and automatic mode. Start-stop logic shall have provisions for cycle cranking and cool down operation
- **Shutdowns/Annunciation:** The generator set shall shut down and red flashing LEDs shall signal operational faults of high water temperature, low oil pressure, over crank and over speed.
- **Safety Devices:** ISO red emergency stop pushbutton shall be provided and all controls, annunciation, and monitors labelled with ISO symbols.

Control wiring from the generator shall be min 1,5mm² (No. 16 AWG) stranded wire, 90°C 600 V AC insulation, UL and CSA listed. Wire identification shall be located on the wire 161 mm from the terminal, while routing shall avoid sharp edges. Control panel ground wire shall be 2.5mm² (12 AWG) with green and yellow striped insulation rated 90°C 600 V AC UL and CSA listed. Wire shall be labelled "GND" and have a ring terminal sized for a 10-32 screw.

5.5.6 Customer Interface Module: A Customer Interface Module (CIM) shall be provided to decode serial link data from the Electronic Modular Control Panel and translate alarm, fault, and status conditions to a set of relay contacts. Contacts shall represent conditions of:

- EMCP diagnostic fault system not in automatic alarm
- High coolant temperature alarm
- Low coolant temperature alarm

- Low oil pressure alarm
- Low oil pressure fault
- High coolant temperature fault
- Over crank fault.
- Over speed fault

Loss of serial data link to the CIM shall cause all relays to energize every two (2) seconds.

Relays shall be individually fused, with single-pole, double throw, gold plated dry contacts. System shall be capable of reliable operation 300 m from the engine.

5.5.7 Synchronize Module: Synchronizing lights and reverse power relay shall be provided for manual paralleling..

5.5.8 Circuit Breaker-Generator Set Mounted: The main line circuit breaker shall be mounted and connected in a guarded drip-proof enclosure meeting NEMA 1, IF 22 and IEC 144.

5.5.9 Switchgear - Multiple Generator Sets: The control system switchgear shall automatically program the station engine generator sets to automatically start, automatic parallel, and automatic share system load. For automatic operation, a contact closure shall initiate engine generator set starting with automatic closing of the generator circuit breakers occurring when conditions for paralleling are within capable tolerances and controlled by synchronizing circuits providing automatic speed correction signals to the engine governor systems. Control circuits shall prevent more than one (1) generator set circuit breaker from simultaneously closing onto a dead bus Automatic load sharing shall occur after closure of the generator circuit breakers and shall be a function of the engine governor system. Voltage regulation shall be a function of the generator automatic voltage regulator systems. Opening of the initiating starting contact shall cause the generator breakers to trip open and the generator sets to run unloaded for a cool down period and then automatic shutdown.

The initiating signal for automatic programming of the generator sets shall be provided by the station automatic transfer switch or switches. Output signals shall be provided when the first and as each sequenced engine generator set is synchronized into the emergency bus. These signals shall designate priority loads to transfer to the emergency power source.

Should an engine generator set fail to start, parallel or develop a critical running monitored fault, the control system shall cause the engine to automatically shut down and trip its circuit breaker.

The control system shall permit manual starting, stopping, and paralleling of the generator sets. Manual control of the individual generator set's speed and voltage shall also be provided. The automatic synchronizing and load sharing circuits shall remain operative in the manual mode. Each generator set shall be manually controlled by the station operator placing the selected engine's mode switch in its manual position with the generator set starting and attaining operating speed/voltage but without automatic closing of the generator circuit breaker. To close the breaker, the Operator shall be required to place the manual synchronizing switch to its "ON" position which shall activate a station synchroscope; and then turn the breaker control switch to its close position.

The control system switchgear shall comprise individual cubicles for each engine generator set plus auxiliary cubicle or cubicles as required and shall be factory assembled to form a station switchboard line-up. The switchboard line-up shall be free standing, self-supporting; NEMA I (IP 22) metal enclosed for indoor service with internal steel barriers forming control breaker, bus compartments plus removable screw secured rear sheets for access to the bus compartments and hinged front doors for access to control and breaker compartments. Open bottom rear areas shall be provided in each cubicle for field cable entrance/exit.

The minimum instrumentation, controls, and protective devices for each engine generator set cubicle, shall be as follows:

One (1) - AC ammeter, LCD digital read-out type, minimum half percent (1/2%) accuracy, true RMS reading.

One (1) - AC voltmeter, LCD digital read-out type, minimum half percent (1/2%) accuracy true RMS reading.

One (1) - Frequency meter, LCD digital read-out type, minimum half percent (1/2%) accuracy 0.1 Hz resolution.

One (1) - AC wattmeter, 3 phase, 3 wire indicating, LCD digital read-out type, one percent (1 %) accuracy.

One (1) - Selector switch circuit to permit reading ampere load in each of the 3 phases plus reading voltage of each phase to phase.

Three (3) - Current transformers for meters, relays, and governor system.

One (1) - Set potential transformers, as required with primary and secondary fuse protection, stationary mounted for meters relays, and governor system.

One (1) - Automatic engine start-stop cranking control module incorporating solid state circuitry, microprocessor based, with watertight modular components and digital instrumentation. Backlit LCDs sequentially rotate display of:

- Oil pressure
- Jacket water temperature Battery DC Volts
- Engine RPM
- Operating hours

The generator set shall shut down and red flashing LEDs shall signal operational faults of:

- High water temperature
- Low oil pressure
- Over crank
- Over speed

Alarms shall visually be annunciated via a flashing LED and audibly annunciated via a horn. A horn silence/acknowledge push button shall be provided which, when pushed, shall silence the horn and hold the LED on solid until the condition is corrected. If another condition occurs after the first; the horn shall sound again and another LED shall flash. Alarms include:

- High water temperature
- Low water temperature
- Low oil pressure
- low coolant level

One (1) - Set of engine monitoring circuits including a LCD display of diagnostic codes for loss of magnetic speed pickup, loss of oil pressure/water temperature signals, loss of start-stop crank control module settings, internal control module fault, shutdown not caused by control module.

One (1) - Mode selector switch for automatic/manual/stop/off-reset operation plus necessary logic circuits for operation with the engine. In the AUTO mode the engine shall be automatically programmed by the system circuits and the generator set shall automatically parallel onto the bus. In the MANUAL mode, the engine shall start and attain operating conditions but the generator set breaker shall not automatically close onto the bus, to parallel or place the generator set on the bus. It shall be necessary for a station operator to turn the synchronizing switch to its ON position and to use the breaker control switch onto the bus in the STOP position. A running generator set shall shutdown with its breaker tripping open. In OFF/OFF RESET the controls shall be de-energized and critical engine faults shall be reset. Any critical fault shall also cause tripping of the generator circuit breaker. Engine cranking/fault shutdown controls shall be DC operated off the engine battery system.

One (1) - Engine cool down run circuit, field adjustable, factory set for five (5) minutes.

One (1) - Generator available circuit with indicating lamp to determine when generator set at approximately 90% voltage, single phase sensing and field adjustable, circuit provides portion of close signal to the generator circuit breaker in conjunction with the automatic synchronizing system

One (1) - Set of auxiliary contacts, two (2) normally open/normally closed (Form C), that function after generator set terminates cranking and wired to terminal board points for remote signal purposes

One (1) - Mounting and wiring of the engine automatic load share parallel governor module furnished by the engine Manufacturer.

One (1) - Manual speed adjust potentiometer, ten (10) turn type, for use with the automatic load share governor module.

One (1) - Automatic synchronizing circuits to sense and compare the incoming engine generator set voltage, frequency, and phase angle with the bus and to provide automatic close signal to the incoming generator set circuit breaker when voltage, frequency and phase angle of both sources are within synchronizing tolerances. Synchronizing monitor shall control speed and phase angle for the incoming engine generator set and provide automatic correction signals for frequency (speed) differences to the engine automatic load share governor module. Synchronizing monitor shall be the same manufacture as the engine load share governor module for operational compatibility.

One (1) - Control circuit to prevent more than one (1) engine generator set breaker from simultaneously closing to a dead bus.

One (1) - Mounting and wiring of the generator automatic voltage regulator devices, if regulator devices are not an integral part of and/or located in the generator.

One (1) - Voltage adjust rheostat for use with the automatic voltage

regulator devices.

One (1) - Reverse power relay, single phase monitoring field adjustable with adjustable time delay, solid state type, fixed mounted inside of cubicle with fault indicating lamp on cubicle door, causes tripping of generator breaker plus engine shutdown.

One (1) - Breaker control transformer, fused protected, fixed mounted and to provide generator AC potential to the generator breaker operating mechanism.

One (1) - Generator breaker control switch with positions tip/lockout, auto close plus position indicating lamps.

One (1) - Synchronizing switch of the removable key handle type.

One (1) - Set of control wiring, terminal boards, fuses, fuse blocks, nameplates.

One (1) - Fail to automatically parallel fault lamp circuit and when activated, shall cause engine shutdown.

One (1) - Control circuit to prevent auto-reclose of generator breaker should breaker trip due to over current fault plus visual indication of fault, shall cause engine shutdown..

One (1) - Lamp to illuminate when engine cranking.

One (1) - Lamp test pushbutton.

One (1) - Genset emergency stop pushbutton, pull or twist to reset type shall also cause tripping of generator main circuit.

5.6.10 Load Sense Demand Circuit: One (1) - Load sense demand monitoring circuit shall be incorporated as part of the common station devices. The following devices shall also be included:

- One (1) - AC wattmeter for total station output capacity, 3-phase, 3 wire indicating, switchboard type.
- One (1) - Set of bus current and potential transformers for use with the load sense monitoring circuits.
- One (1) - Electric motor operator installed on front or side of the air circuit breaker.

5.5.11 Main Bus Bars: One (1) - Set of 3-phase copper main bus bars rated in accordance with the switchboard cubicle layout for the capacity of the generator set with half size neutral bus plus bar risers off the generator breaker to the main bus and separate ground bus bar.

5.5.12 Protective Relays: One (1) - Loss of excitation protective relay (leading VAR type) switchboard draw out type, device 40.

One (1) - Generator phase unbalance protective relay and circuitry, switchboard draw out case type, solid state, device 46, 3-phase monitoring type.

5.5.13 Battery Charger: A battery charger, automatic type with nominal current 15 A shall be provided which shall accept 240 Volt AC single phase input to provide 24 Volt DC output.

It shall be fused on the AC input and DC output, and incorporate current limiting circuitry avoiding the need for a crank disconnect relay and shall avoid over charging of batteries. An AC voltage power switch shall be mounted on the face of the charger and shielded from accidental switching. The charger shall include an AC ammeter and voltmeter, a failure malfunction alarm switch, and be housed in a NEMA I enclosure suitable for wall mounting.

5.5.14 Automatic Transfer Switch: The automatic transfer switch shall be three-pole, 11000 Volt AC, fully rated enclosed switch which complies to NEMA ICS2-447, NFPA 70, NFPA 99, NFPA 110, and UL 1008. It shall incorporate solid state programmable logic, be assembled and tested, and include:

One (1) - Sheet steel NEMA I enclosure with hinged, key lockable door

One (1) - Operating transfer switch consisting of switch assembly, transfer mechanism, and intelligence panel

One (1) - Solderless connectors for normal source cables, emergency source cables, load cables, and solid neutral bar

One (1) - Manual transfer capability of transferring under load

One (1) - High instantaneous trip in both breakers (under 1200 Amperes)

One (1) - Voltage monitoring of each phase of normal source (full protection)

One (1) - Voltage and frequency monitoring of one (1) phase of emergency source

One (1) - Time delay, engine starting, adjustable 0 to 50 seconds, set at 3 seconds

One (1) - Time delay, emergency to normal, adjustable 0 to 30 minutes, set at 10 minutes

One (1) - Four (4) position mode selector switch in the face of the enclosure, marked test, auto, off, and engine start

One (1) - Three (3) pilot lights in face of enclosure indicating source to which the A TS is connected

- Green - normal
- Red - emergency
- White - mode switch in OFF position

One (1) - Engine start contact, close to run, voltage tree

One (1) - Light duty auxiliary contacts for use in handling added pilot lights, and single pole double throw switch with each breaker

One (1) - Internal cabling, terminal boards, fuses, fuse blocks, nameplates, and miscellaneous hardware as needed

One (1) - Software consisting of: dimensional Drawing, layout Drawing, electrical schematic, and parts list.

The manufacturer shall proof compliance with this technical specifications.

6. DAY TANK

Dedicated day tank shall be provided for the generators in the generator rooms, including return fuel system with a redundant fuel pumping system.

6.1. Codes and Standards

The fuel day tank and all associated equipment and components shall be manufactured in accordance with the following applicable standards: UL-142 Above Ground Flammable Liquid Tanks • CAN/ULC-S601-07 Steel Above Ground Tanks for Flammable and Combustible Liquids • UL-508 Industrial Control Equipment (ECM) • American Welding Society (AWS) – Welders certified AWS standards D 1.1 / D 1.1M

Production pressure test shall be performed by the manufacturer on each tank prior to shipping in accordance with prevailing standards of UL-142 and CAN/ULC-S601-07. These tests are intended to verify compliance with production requirements of the standard for leakage. The test is to be conducted before painting the tank by applying an internal air pressure and using soap suds, or equivalent material, for the detection of leaks. For a horizontal or rectangular tank, the test gauge pressure is to be not less than 3 psi (21 kPa). If a leak should be detected during production testing, the leak shall be repaired. Tanks shall be retested until zero leaks are apparent during two (2) successive test periods. A record of the manufacturer's testing shall be permanently maintained and available to the end user or customer.

Fuel Day Tank capacity shall be based on NEC 2011, NFPA 70, Article 701.12 (B) (2). The day tank for each generator shall not be less than 1,700 litres and shall not exceed 2,500litres.

Fuel Day Tank shall be made of heavy gauge steel construction. Tank shall include removable, welded steel top cover for indoor applications. Tank shall be coated with rust inhibitor within inner tank, primed and finish painted on external tank. The installing contractor shall provide schedule 40, ASTM A 53, black iron pipe connections to the day tank fittings. All connections to be made with pipe unions to facilitate tank service/removal.

The tank shall be provided with atmospheric (normal) vent cap with screen and emergency pressure relief vent as per per the requirements of NFPA 30 and UL 142 / ULC S601. Emergency vent cap shall be spring-pressure operated. Opening Pressure shall be 0.5 psig; full opening pressure 2.5 psig. Flow rate shall be marked on top of each vent.

6.2. Design Requirements

6.2.1 Fuel Day Tank Control, Alarm and Status Display.

A microprocessor-based electronic control module (ECM) shall be provided for control of redundant pump operation. The pumps shall be supplied with power from existing standby power system.

The ECM shall receive a signal from a single electrical analog float sensor. The ECM shall be provided with the following indications: fuel level, alarm, function, and existing warning and shutdown conditions and be located within an enclosure designed for indoor use. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright

room lighting conditions. All warnings shall be provided with normally open and normally closed, dry contacts for remote annunciation.

The following alarm, shutdown and status conditions are required as a minimum:

Fuel Level Display

- Full – 100% Green LED Indicator
- 95% – Green LED Indicator
- 85% – Green LED Indicator
- 75% – Yellow LED Indicator
- 50% – Yellow LED Indicator
- 25% – Yellow LED Indicator
- 10% – Yellow LED Indicator
- Empty – 6% – Red LED Indicator

Alarm Display

- High Fuel – 106% or greater of Capacity
- Low Fuel – 62% of Capacity • Critical Low Fuel – 6% of Capacity
- Fuel within Containment
- ECM Functional – Tank Fault

Function Display

- Power on — This button activates the ECM after the Off button has been depressed. On any initial power up condition, after a power outage, the ECM shall be in an on condition.
- Pump running – For redundant pump operation fuel pump control panel shall indicate Pump A or Pump B running. Pump running relay shall provide local contacts for remote monitoring, indicating pump is running.

Remote Contact Connections

- Tank Fault (ECM Functional)/Fuel in Containment (Shared)/Loss of Power
- Critical High Fuel – 106% or greater of capacity
- Pump Running Option — Indicating supply pump is in operation
- High Fuel — 106% of capacity
- Low Fuel — 62% of capacity
- Critical Low Fuel — 6% of capacity

Mode

- On – Power available to ECM
- Off – Turns off power within ECM
- Test – Shall force supply pump(s) to operate at time of start-up to verify overflow return line has been piped correctly and that there are no leaks within the system.

Start-up test switch shall test contacts for high, low, critical low, ECM functional and containment switch to assure wiring of remote contacts is correct.

Critical high-level automatic discrete shutoff switch shall stop supply pump delivery to the fuel day tank at the tank critical high liquid level. The critical

6.3. Pump Operation

Two redundant supply pumps and motors shall be provided and shall operate alternately when refuelling the day tank. The lead pump shall activate when fuel level decreases to 87% of capacity; the lag pump shall activate in tandem with the lead pump if the fuel level decreases to 75% of capacity. The supply pump operation shall stop at 100% of tank capacity.

The pumps shall have adequate suction and delivery head and adequately sized to provide at least 15 minute fill cycle at full load and with capacity of at least 70 litres per minute. Appropriately sized check valves with fuel strainers shall be provided on the pump fuel inlets. The motor shall be 415 240VAC, 1 phase, 50 Hz, thermally protected.

The manufacturer shall proof full compliance with this specifications.

7. UNDERGROUND STORAGE TANK FOR FUEL

An underground tank with a *tank rated capacity* of 30,000litres shall be installed for storage of diesel fuel. The *tank rated capacity* shall be the net capacity after consideration of the overflow prevention headspace margin allowance.

The tank shall be made of Q235B carbon steel suitable for underground installation or equivalent material.

The steel for the body shall single wall of minimum 8mm thick and minimum 10mm for the shell end. The tank shell shall be minimum 6mm thick Q235b steel and the tank ends shall be 8mm thick. The corrosion allowance shall be 1.5mm. 2 manholes shall be provided. It shall have a design lifespan of at least 30years. It shall internally and externally coated and shall be cathodically protected. The outer protective coating shall be minimum 4mm thick.

The design pressure shall be 0.08MPa, and design operating temperature (-10 to +60) degree centigrade.

The tanks shall have a mechanism to allow for measuring the amount of product in the tank both by dipping and electronically with product level data transmitted to the human machine interphase. The contractor shall provide a calibrated dipping gauge.

The tank shall be installed at least 1 metre from a building and at least 0.6m from adjacent tanks.

Tank area must be barricaded to prevent any vehicle travel over the tanks until installation is complete.

The contractor shall excavate the site for installation of the tank and cart away the spoil to an area shown by the Engineer within the airport. The tank excavation shall be large enough to provide at least 600 mm clearance between the excavation walls.

The depth of the tank excavation shall take into account the size of the tank as well as the following factors:

- Excavation Depth - Burial holes must be deep enough to allow a minimum of 300mm (12 in) approved backfill bed over the hole bottom or concrete slab.

- Cover Depth – The area the tank shall be installed shall be non-traffic and the tank must have a depth of cover of a minimum of 900mm of approved backfill.
- Pad Dimensions - Reinforced concrete, concrete or asphalt paving at the surface must extend at least 600mm (24 in) beyond tank outline in all directions.
- Maximum Burial Depth - Depth of cover for single wall tanks of 3 m (10 ft.) or less in diameter in both traffic and no-traffic conditions must not exceed 2.1 m (7 ft.) over tank top. Depth of cover for double wall tanks must not exceed 1 m (3 ft). For larger tanks, use manufacturer's instructions.
- A petroleum-resistant barrier shall be placed on a layer of backfill material on the floor only of the excavation and sloped to the sump(s) for the installation of the monitoring well(s).

The bottom of the excavation shall be stabilized and a concrete slab provided. It shall then be covered with suitably graded, levelled and compacted backfill material to a depth of at least 150 mm.

The tank shall be anchored on the base slab. The anchor bolts shall be properly aligned and extend no more than 600 mm above the anchoring device. Anchor straps and hardware shall be coated and shall be installed in such a manner that they do not interfere with the protective coating on the tank. If metal anchor straps are used, they shall be separated from the tank by a 3 mm thick neoprene band or equivalent non-conducting material. All straps shall be tightened to give a snug fit before backfilling and care taken to prevent damage from over tightening. After the tank has been positioned in the excavation, the coating shall be inspected visually and any damaged portions repaired using the manufacturer's patching kit.

Bedding and backfill material shall consist of homogenous pea gravel, crushed stone, clean sand or natural earthen materials.

Pea gravel shall particle size not less than 3 mm (1/8 in) or more than 19 mm (3/4 in) in diameter. The materials shall be clean and free of all foreign materials, such as but not limited to, bricks, metals, concrete and plastics. Materials excavated from the subject site(s) shall not be used for backfilling.

Washed stone or gravel crushings with angular particle size not less than 3mm (1/8 in) or more than 13mm (1/2 in) in diameter are acceptable as an alternate backfill material. Clean sand and natural earthen materials may be used subject to approval by the Engineer.

Backfill shall be placed into the excavation in 12-18 inch (305-458 mm) vertical lifts, compacted after each lift, at least 60% up the vertical height of the tank. The contractor shall ensure there shall be no water during the backfill.

Backfill material shall be free of large rocks, debris or foreign materials that could damage the tank. Impacting tanks during backfilling shall be avoided.

At the start of backfilling care must be taken to push approved backfill material completely beneath the tank bottom, between the ribs and under the end caps to provide the necessary

support. A board or similar device shall be used to push backfill under the tank. After the backfill is 600 mm (24 in) up the side of the tank use a shovel handle to work the backfill into all voids. This is a critical step as neither stone nor gravel will flow under the tank.

The tank shall be vented and shall be pressure tested at 35 KPA (5 psi) maximum for 2 hours (or in accordance with manufacturer's instructions) to ensure that there is no evidence of leaks as indicated by loss of pressure.

When piping is completed, backfilling will be done with approved material to grade or at least 300 mm over top of ribs, followed by readily compacted backfill separated by a soil stabilization fabric. Concrete blocks shall then be laid on top.

The area around the tank shall be raised, surrounded with road kerbs and concrete slabs installed. The kerbs used shall be to level with the concrete slabs. The contractor shall also reinstate all areas affected by use of materials similar to original.

A lockable chamber shall be provided for access to tank manholes.

Underground piping up shall be provided with secondary containment. Leak detection systems shall be provided on all pressurized fuel lines.

Spill containment devices shall be installed at the top of the fill pipe, which shall contain product spills which occur while disconnecting delivery hoses. These devices shall conform to the requirements of ULC/ORD-C58.19

Overfill Protection Devices Fitted on the drop tube inside a tank, overfill protection devices gradually reduce the flow of product into the tank as the product level approaches maximum capacity. These devices shall conform to the requirements of ULC/ORD-C53.15, "Standard for Overfill Prevention Devices for Flammable Liquid Storage Tanks".

8. DIESEL LEVEL MEASUREMENT IN THE UNDERGROUND TANK

A precise fuel level measuring system shall be installed for the underground fuel tank. The system shall have a life of not less than 15 years.

The system shall consist;

- i. Hydrostatic fuel level measuring sensor, made of non-corrosive materials
- ii. Requisite power supply system
- iii. Requisite cabling
- iv. Human machine interface.

The system shall be configured to monitor up to 3 tanks, 2 of which are not part of this project and shall be installed in a separate contract. Only one tank shall be connected in this project.

The sensors shall be multi probe and robust and shall have high measurement reliability and overload resistance. It shall be easily mountable on the tank. It shall;

- Be calibrated to give accurate, real-time data
- Shall Continuous self-monitoring give live data readings on 24 hour basis
- Shall give data on replenishment requirements
- Shall maintain logs of daily fuel levels
- Shall have suitable sealing materials to resist wear
- Shall be at least IP68 rating
- Shall display device status and maintenance requirements
- Designed to transmit fuel level data via the intranet/internet
- Possible to import collected data to inventory management programs such as Microsoft Excel or Access
- Graphical representation of historical data.
- Shall be password protected for user and administrator
- Measurements unaffected by the medium or changes to the mediums properties such as temperature, pressure or dielectric constant.
- Shall display alarms/errors
- The sensor system shall be easily accessible and easy to maintain, with protection from ingress of foreign objects to the tank during maintenance.

One wall mounted IP65 Human Machine Interface (HMI) display shall be installed to the redundant fuel level measuring system. The HMI shall be remotely located in the manning office.

The system shall have local wall mounted displays for each generator, powered on 240VAC mains power supply. The display shall be installed in an IP65 enclosure and shall be sunlight readable. It shall display fuel volume in litres. They shall be suitable permanently marked.

Calibration of that tank shall be done in accordance with API standards of equivalent. A copy of standard used, calibration data and as build drawings for the tank shall be submitted to the employer.

The manufacturer shall submit shop drawings and designs for the diesel storage tanks. The necessary approval for the successful bidder shall be sought from ERC and other regulatory agencies.

9. ELECTRICAL CABLING

The generators shall be connected to the electrical distribution boards with copper conductor cables of a minimum rating of (12/20)kV.

The cable shall be suitable for burying underground and installation in ducts.

The cable shall be in single 240mm² cores. 3 cores shall connect every emergency generator.

Each installed cable core shall be continuous WITH NO joints (shall be free from joints).

The cable conductor shall be stranded compacted circular, class 2, (reference IEC 60228), and manufactured of soft electrolytic copper wire.

The inner semi-conductive screen shall be extruded thermosetting semi-conducting screen bonded over the conductor, without causing damage to conductor or insulation.

The insulation material shall be tree retardant cross-linked polyethylene (TR-XLPE) satisfying characteristics specified in IEC 60502-2 or equivalent standards.

The insulating layer, the semiconductor layer and the semi-conductive screen will be applied by a triple extrusion process, not being admitted any type of lacquer or other material between them.

The nominal insulation thickness shall not be less than 4.9mm. The minimum insulation thickness shall not be less than 90% of the nominal value. The insulation must allow maximum conductor temperatures of 90°C in normal operation and 250 °C in short circuit for at least 5 seconds.

An outer thermosetting semi-conducting screen manufactured of XLPE compatible with insulation and temperatures in normal operation and in short circuit shall be laid over the insulation screen.

A water swell material made using a semi-conductive tape with a minimum overlap of 10% shall be laid and shall meet the IEC 60502-2 standard or equivalent water penetration test.

The cable shall have a wire screen made of a continuous crown of annealed copper wires with diameter between 0.5 and 1.0 mm, arranged in an open helix with step not greater than 20 times the cable diameter before the screen. The outer sheath shall be of outer sheath of polyethylene type ST7 or PVC type ST2.

The longitudinal water blocking inside the conductor and/or under the outer sheath must at least meet the requirements of water penetration test in IEC 60502-2 or equivalent.

The cable shall have permanent marking, easily legible and carried out by engraving or in relief on the outer sheath in a continuously way.

Solid copper cable lugs to suit the 240mm² (12/20)kV TR-XLPE cable with fastening holes matching cable glands shall be provided.

The contractor shall provide all required accessories and terminate the cable to the standby generator and existing power distribution panels.

The installation shall include clamping of cables by readymade G.I. spacers, saddles or clamps fabricated, cutting of the cable as per actual measurement/cable schedule, Clamping of Cable on cable tray, supply of all clamping materials and hardware etc., providing permanent vandal proof cable tags with cable number and size punched on it. Cable tags shall be tied to cables at every 15 meter interval and at both the ends of cable.

The installation shall include earthing of the generator and all accessories.

Staff responsible for completing the jointing work must take precautions before signing permits for energisation, to ensure that there is no risk posed to staff and the public.

The insulation resistance shall be measured prior to HV testing

The Insulation Resistance (IR) test shall be both the phase-to-phase and phase-to-earth. This shall be by use of Insulation Resistance Tester (IRT).

High voltage test between each phase conductor to earth and between phases shall be done and at the time of testing, the remaining phases not under test shall be earthed. The cable shall have no disruptive discharge or puncturing of the insulation.

Phase identification must be checked by the use either of the phasing resistors or a continuity check of each individual core wherever possible after all jointing work has been completed. Alternatively, the current injection phasing method may be used. The cables shall be appropriately marked on identification.

Phase identification checks and marking must be carried out to ensure cables have been correctly connected as indicated on existing system diagrams or System Alteration Order.

Phase rotation check shall be carried out before connection of the cables.

10. EXECUTION

The following articles and paragraphs are intended to define acceptable procedures and practices of inspecting, installing, and testing the generator set and associated equipment.

10.1. FACTORY INSPECTION

On completion of manufacturing, an inspection visit will be conducted at the premises of the manufacturer for 4 x client representatives. Contractor to arrange VISA, travel insurance, return air tickets and per-diem allowance.

10.2. PRE-DELIVERY INSPECTION

A pre-delivery inspection must be performed by the system Manufacturer's local Agent at the dealer's facility to ensure no damage occurs in transit and all genset components, controls, and switchgear are included as specified herein.

10.3. PRE-DELIVERY TESTING

Prior to delivery and acceptance, the generator set shall be tested to show it is free of any defects and shall start automatically and carry full load.

The testing shall be done on dry type, resistive load Banks capable of definite and precise incremental loading. Salt water brine tanks or load tanks requiring water as a source of cooling shall not be allowed.

The load Banks shall not be dependent on the generator control instruments to read amperage and voltage on each phase. Rather, the test instrumentation shall serve as a check of the generator set meters.

Load Bank testing shall be done in the presence of the Engineer and 3 x client representatives. Testing shall be for minimum of four (4) hours under full load.

All consumables necessary for testing shall be furnished by the Contractor. Any defects which become evident during the test shall be corrected by the Contractor at his own expense prior to shipment to the job site.

10.4. INSTALLATION

The installation shall be performed in accordance with shop drawings, specifications, and the Manufacturer's instructions.

10.5. GROUNDING

Provide equipment grounding connections for diesel engine driven generator unit. Tighten connections to comply with tightening torques specified in UL Standard 486A to ensure permanent and effective grounding.

10.6. PERSONNEL TRAINING

Train Employer's maintenance personnel in procedures for starting up, testing and operating diesel engine-driven generator sets. In addition, train Employer's personnel in periodic maintenance of batteries and the generator sets for 12 personnel.

10.7. FACTORY TRAINING

Train Employer's maintenance personnel in maintenance, servicing, overhaul, procedures for starting up, testing and operating diesel engine-driven generator sets for 6 personnel in the manufacturer's factory for a minimum of two weeks. Contractor to provide arrange VISA, travel insurance, return air tickets and per diem allowance.

The contractor shall develop a factory training program from the assembly, testing and manufacture of equipment. The training program shall include knowledge transfer on Level 1 and level 2 maintenance of the equipment.

The program shall form part of the evaluation on technical compliance section (iv) of the evaluation.

10.8. SPARE PARTS

A list of all spare parts required for adjustment, operation, and maintenance of the equipment shall be submitted in accordance with the requirements set forth at the Conditions of Contract.

In addition, all special tools required for adjustment operation, and maintenance of the equipment plus the following spare parts shall be furnished with each unit:

- Five (5) sets of air filter elements
- Five (5) sets of lube oil filter elements
- Five (5) sets of fuel oil filter elements
- One (1) thermostat

- One (1) set of gaskets required for routine operational maintenance, but not limited to, the following:
 - cylinder head gaskets
 - oil pan gaskets
 - water pump gaskets
 - exhaust manifold gaskets
 - thermostat housing gaskets
- One (1) set of hoses and belts including one of each different size and type
- Two (2) complete fuel injection nozzles or ejectors.

The manufacturer shall submit with the offer a complete set of service parts for 2years maintenance.

The Manufacturer shall submit a priced list of the recommended spare parts sufficient for three (3) years of operation.

11. TESTING AND COMMISSIONING

- I.1 All supplied equipment shall be tested in accordance with the manufactures recommendations in order to;
- i. verify proper functioning of the equipment/system after installation,
 - ii. verify that the performance of the installed equipment/systems meet with the specified design intent; and
 - iii. Capture and record performance data of the whole installation as the baseline for future operation and maintenance.
- I.2 All testing, calibration and setting of equipment and controls associated with this installation shall be carried out and the Contractor shall supply instruments, materials and labour necessary for this.
- I.3 The Contractor shall be responsible for the complete and thorough testing, commissioning, and adjusting of the systems and equipment installed and to bring into safe and reliable operation of the entire standby electrical power system
- I.4 The contractor shall notify the engineer in writing of his program to test and commission the equipment and systems at least five (5) days before actual execution. No tests and commissioning shall commence and be executed without being witnessed by the engineer.
- I.5 The commissioning procedure shall involve running the equipment for 8-hours non-stop and recording the data for comparison with the manufacturers.
- I.6 The contractor shall be responsible for supply of all the fuels and lubricants for the purpose of testing and commissioning.
- I.7 The Manufacturer shall issue a certificate of final commissioning upon satisfactory test to the client. The Project Engineer and Site supervisor shall sign the documents on behalf of the client.

- 1.8 The contractor shall submit three (3) copies of a written report on the results of test, etc. within seven (7) days of completion of such test, irrespective of test results.
- 1.9 The contractor shall deploy on a full time basis for at least two (2) weeks after the practical completion date, one supervisor or equal to attend to complaints relating to malfunctions, tripping, and unbalance and to readjust where necessary to suit the requirements of the user.

2. **Training**

- 2.1 The Contractor shall prepare training materials and conduct all training for system users, administrators and maintenance staff. The Employer will provide a training classroom to conduct the training.
- 2.2 The training shall include operational procedures and recovery techniques in case of a total system failure applicable both for the emergency power generating system running in its intended integrated environment as in a stand-alone environment
- 2.3 All training and training documents shall be conducted in the English language.
- 2.4 The manufacturer shall submit a comprehensive factory training program for technical personnel. The training program shall form part of evaluation compliance.

12. **SCHEDULE OF DEVIATIONS FROM TECHNICAL SPECIFICATION**

- A. All deviations from the Technical Specification shall be filled in by the Bidder clause by clause in this schedule.

SECTION	SPECIFICATION	CLAUSE NO.	DEVIATION
Etc.			

- B. The tenderer hereby certifies that the above mentioned are the only deviations from the technical specification. The tenderer further confirms that in the event any other data and information presented in the tenderer's proposal and accompanying documents including drawings, catalogues, etc., are at variance with the specific requirements laid out in the technical specifications, then the latter shall govern and will be binding on the tenderer for the quoted price.

Signature of Tenderer

13. **SPARE PARTS**

- A. The bidder shall submit with the tender a list of recommended fast moving spare parts that may be used within 3 years from commissioning, including a breakdown of prices.
- B. Spare parts supplied under the contract shall be properly packed for long time storage.

SECTION VI: DRAWINGS

No	Drawing No	Drawing Title	Size
1.		Substation layout	A1
2.		Proposed Schematic drawing	A1
3.			
4.			
5.			
6.			
7.			
8.			

SECTION VII: BILLS OF QUANTITIES

Notes for preparing Bills of Quantities

1.0 Preamble to Bill of Quantities

- a) The Bill of Quantities shall form part of the Contract Documents and is to be read in conjunction with the Instructions to Tenderers, Conditions of Contract Parts I and II, Specifications and Drawings.
- b) The brief description of the items in the Bill of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed descriptions given in the conditions of Contract and Specifications for the full direction and description of work and materials.
- c) The Quantities set forth in the Bill of Quantities are estimated and provisional, representing substantially the work to be carried out, and are given to provide a common basis for tendering and comparing of Tenders. There is no guarantee to the Contractor that he will be required to carry out all the quantities of work indicated under any one particular item or group of items in the Bill of Quantities. The basis of payment shall be the Contractor's rates and the quantities of work actually done in fulfillment of his obligation under the Contract.
- d) The prices and rates inserted in the Bills of Quantities will be used for valuing work executed, and the Engineer will measure the whole of the works executed in accordance with this Contract.
- e) A price or rate shall be entered in ink against every item in the Bill of Quantities with the exception of items, which already have provisional sums, affixed thereto. The Tenderers are reminded that no "nil" or "included" rates or "lump-sum" discounts will be accepted. The rates for various items should include discounts if any. Tenderers who fail to comply will be disqualified.
- f) Provisional sums (including Dayworks) in the Bill of Quantities shall be expended in whole or in part at the discretion of the Engineer in accordance with Sub-clause 36.4 of part of the Conditions of Contract.
- g) The price and rates entered in the Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional plant to be used, labour, insurance, supervision, compliance, testing, materials, erection, maintenance or works, overheads and profits, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract, transport, electricity and telephones, water, use and replenishment of all

consumables, including those required under the Contract by the Engineer and his staff.

- h) Errors will be corrected by the Employer for any arithmetic errors in computation or summation as follows:
 - (i) Where there is a discrepancy between amount in words and figures, the amount in words will govern; and
 - (ii) Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer, there is an obviously gross misplacement of the decimal point in the unit price, in which event the total amount as quoted will govern and the unit rate will be corrected.
 - (iii) If a Tenderer does not accept the correction of errors as outlined above, his Tender will be rejected.
- i) “Authorized” “Directed” or “Approved” shall mean the authority, direction or approval of the Engineer.
- j) Unless otherwise stated, all measurements shall be net taken on the finished work carried out in accordance with the details shown on the drawings or instructed, with no allowance for extra cuts or fills, waste or additional thickness necessary to obtain the minimum finished thickness or dimensions required in this Contract. Any work performed in excess of the requirements of the plans and specifications will not be paid for, unless ordered in writing by the Engineer.
- k) The contractor may be required to utilize some 75mm diameter PVC ducts that exist in the employer’s yard and an equivalent quantity may be reduced from the Bills of Quantities.

2.1 SCHEDULE I – PRELIMINARIES AND GENERAL

	DESCRIPTION	UNIT	QTY	TENDER RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.1.1	Allow for provision for bonds and insurances including profits	Sum				
2.1.2	Provide for setting up, mobilization and demobilization including profits and overheads	Sum				
2.1.3	Allow for provision of temporary office and store for the contractor (the office space should accommodate at least 15 seating capacity for onsite meetings, it should be fully furnished with a 1No. table, 15-armrest chairs)	Months	8			
2.1.4	Allow for comprehensive level 1& 2 factory training for six (6) maintenance technician during manufacture and assembly and testing for the equipment (the rates include air travel, accommodation, and airport transfer for the training period in the country of manufacture).	sum				
2.1.5	Allow for site communication, telephone and airtime cost for project engineer and site team	sum				
2.1.6	Allow for site office stationary, printer and laptop workstation for the engineers team. (1No. Printer, 1No. Photocopier, 2No. laptops, printing and writing materials during the period of the contract)	Sum				
	SUBTOTAL FOR SCHEDULE I					

2.2 SCHEDULE 2 - MATERIALS AND INSTALLATION

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.2.1	<i>Decommissioning, demolition and permanent repair works</i>					
2.2.1.1	Allow for supply, positioning and unloading of 40feet standard lockable containers including padlocks for storage of decommissioned generators	No	2			
2.2.1.2	Allow for careful disconnection and careful removal of existing 1.4MW standby generator including generator cooling tower and storage of the same in 40feet containers	No	1			
2.2.1.3	Allow for demolition of existing cooling tower plinths and remove the spoil	Sum				
2.2.1.4	Carry out permanent repairs on all areas affected during removal of the generators and cooling towers on 2.2.1.2 and 2.2.1.3 above	Sum				
2.2.2	<i>Construction of generator plinths</i>					
2.2.2.1	Allow for construction/adjustment of generator plinths	No.	1			
2.2.2.2	Allow for construction of radiator plinth	No.	1			
2.2.3	<i>Supply and installation</i>					

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.2.3.1	Supply and installation of 2MVA 11kV (when derated at site, JKIA) 11kV P.F=0.8 50Hz 3Phase emergency generator set with alternator complete with all fittings and accessories as specified in the technical specification including radiator, residential type silencer, exhaust piping, anti-vibration mounts, set of maintenance free batteries, electrical battery charger, engine control and instrumentation panels, safety isolators and all other required accessories and requisite cabling – NB: with remote wall mounted radiator	No.	1			
2.2.3.2	Supply and installation of 2MVA 11kV (when derated at site, JKIA) 11kV P.F=0.8 50Hz 3Phase emergency generator set with alternator complete with all fittings and accessories as specified in the technical specification including radiator, residential type silencer, exhaust piping, anti-vibration mounts, set of maintenance free batteries, electrical battery charger, engine control and instrumentation panels, safety isolators and all other required accessories and requisite cabling – NB: with remote external floor mounted radiator	No.	1			
2.2.3.3	Supply and installation of SM6 switchgear, similar to existing, including interfacing with existing.	No	1			
2.2.3.4	Supply and install dedicated fuel day tank for indoor application with sufficient functional capacity for operating the engine under maximum site design load for at least 4 hours; including all ancillaries and interconnection piping.	No.	2			

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.2.3.5	Excavation for underground fuel tank including carting away spoil, preparatory works, supply bedding materials, backfilling and compacting and pavement reinstatement as per specifications	Sum				
2.2.3.6	Supply and installation of fuel underground storage tank with minimum 30,000litres tank rated capacity as per specifications	No	1			
2.2.3.7	Supply, and installation, and calibration of automatic fuel level measuring system including IP68 hydrostatic fuel level measuring sensor made of non-corrosive materials, requisite power supply system, requisite cabling, local display and remote display (Human machine interface)	Sum				
2.2.3.8	Supply, and installation of automatic pumping system to pump from new and existing underground bulk storage tank to the day tanks of the new generator sets including all interconnection piping, valves, requisite cabling and all accessories	Sum				
2.2.4	Cables Tray/Rack and Cabling					
2.2.4.1	Supply and installation of galvanized steel heavy duty cable ladder/trays minimum 300mm wide by 50mm depth by 4mm thickness to be installed in service ducts including all bends, fixing materials, unistrut, hangers, treaded, rod and any additional materials necessary to complete the installation	Sum				

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.2.4.2	Supply and installation of 240mm ² (12/20)kV TR-XLPE -insulated copper single core power cable (3-cores per generator) for connecting the generators to the change-over switchgear including copper lugs, cable glands, stainless steel bolts and all other required accessories, clamping of cables by readymade G.I. spacers, saddles or clamps fabricated, cutting of the cable as per actual measurement/cable schedule, Treasing and Clamping of Cable on cable tray, supply of all clamping materials and hardware etc., providing permanent vandal proof cable tags with cable number and size punched on it.	m	400			
2.2.5	Supply and installation of copper communication control cables, 12 pairs	m	150			
2.2.6	Allow for synchronizing of 2no new emergency standby generator sets with 4no existing emergency standby generator sets.	Sum				
	SUBTOTAL FOR SCHEDULE 2					

2.3 SCHEDULE 3 – SUPPLEMENTARY ITEMS

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTALL	
2.3.1	Allow for testing of the completed installations	No	2			
2.3.2	Allow for commissioning of completed works as per the procedures	Sum				
2.3.3	Supply tool boxes with maintenance tools; <ul style="list-style-type: none"> • General maintenance tools • Torque wrenches • Specialized tools 	Sets	3			
2.3.4	Safety equipment/items like Rubber Mats and in accordance with manufacturer recommendations	Sum				
2.3.5	Supply 3 sets of as-built drawings in DWG format	Sum				
2.3.6	Supply 3 sets of service and overhaul manuals	No	3			
2.3.7	Supply 3 sets of maintenance manuals including maintenance programs	No	3			
2.3.8	Supply 3 sets of fuel tank calibration data	No	3			
2.3.9	Provisional sum for formal generator factory training for four (6) staff	Sum				3,000,000
2.3.10	Provisional sum for factory acceptance testing by three employer's (3) staff	Sum				3,000,000
2.3.11	Provisional sum for formal generator training on site JKIA for ten (10) staff	Sum				500,000
	SUBTOTAL FOR SCHEDULE 3					

2.4 SCHEDULE 4 – RECOMMENDED SPARE PARTS

	DESCRIPTION	UNIT	QTY	RATE		AMOUNT INCLUSIVE OF ALL TAXES
				MATERIALS	INSTAL L	
2.4.1	Supply of recommended spare parts for 3 years use (provide breakdown of the spare parts)	Sum				
2.4.2	Supply of recommended spare parts for overhauling the generators	Sum				
2.4.3	Local fuel level display	No.				
2.4.4	Remote fuel level display (human machine interphase)	No.				
2.4.5	Fuel level sensors	No.				
	SUBTOTAL FOR SCHEDULE 4					

2.5 SUMMARY OF TOTALS

Item	Description	Amount
2.5.1	Total for Schedule 1 – Preliminary	
2.5.2	Total for schedule 2 – Materials and Installation	
2.5.3	Total for schedule 3 – Supplementary Items	
2.5.4	Total for Schedule 4 – Recommended Spare Parts	
2.5.5	SUBTOTAL	
2.5.6	Add 5% contingency on subtotal item 2.5.5	
2.5.7	SUBTOTAL INCLUDING CONTINGENCY	
2.5.8	TOTAL TENDER SUM (INCOTERMS DDP) AND MUST BE INCLUSIVE OF ALL TAXES	

Total tender sum in words: Kenya Shillings

_____ Cents

(Bidder's Signature)

(Date)

For and on behalf of: _____

Witness: _____ Date: _____

Address: _____

Official Seal/Stamp:

SECTION VIII: STANDARD FORMS

FORM OF TENDER.....	94
APPENDIX TO FORM OF TENDER	96
STATEMENT OF FOREIGN CURRENCY REQUIREMENTS	98
FORM OF TENDER SECURITY	99
TENDER QUESTIONNAIRE	100
CONFIDENTIAL BUSINESS QUESTIONNAIRE.....	101
LITIGATION HISTORY	103
SELF-DECLARATION FORM.....	104
MANUFACTURER'S AUTHORISATION FORM	105
LETTER OF NOTIFICATION OF AWARD	106
LETTER OF ACCEPTANCE.....	107
PERFORMANCE BANK GUARANTEE (UNCONDITIONAL)	108
FORM OF AGREEMENT	109
CERTIFICATE OF TENDERER'S VISIT TO SITE	111

FORM OF TENDER

TO: Managing Director
Kenya Airports Authority
P.O. Box 19001-0050, Nairobi

Date: _____

Tender No: KAA/OT/JKIA/1534/2018-2019

Dear Sir,

1. Having examined the tender documents including Addenda Nos. _____ [insert numbers] the receipt of which is hereby duly acknowledged, in accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of _____ [Amount in figures]

_____ [Amount in words]
2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Employer's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender for **(120) days** after tender opening, and it shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this _____ day of _____ 20____

Signature _____ in the capacity of _____

duly authorized to sign tenders for and on behalf of _____

_____ [Name of Employer]

of _____ [Address of Employer]

Witness;

Name _____

Address _____

Signature _____

Date _____

APPENDIX TO FORM OF TENDER

(This appendix forms part of the tender)

CONDITIONS OF CONTRACT	AMOUNT
Tender Security	Kshs.2,000,000.00
Amount of Performance Security	Ten percent of Tender Sum in the form as defined in the appendix to Instructions to Tenderers
Program to be submitted	Not later than fourteen days after issuance of Order to Commence
Minimum amount of Third Party Insurance	Kshs.10,000,000.00
Period for commencement, from the Engineer's order to commence	Within seven (7) days
Time for completion	Twelve (12) months
Amount of liquidated damages	Amount for each day of delay: 0.05 % of contract price
Limit of liquidated damages	10% of Contract Value
Defect Liability period	One (1) calendar year subject to Clause 30.4 of the Conditions of Contract
Percentage of Retention	5% of Interim Payment Certificate
Limit of Retention Money	5% of Contract Price
Minimum amount of interim certificates	Contract value/Time for completion in months
PAYMENT TERMS	<p>Payment in foreign currencies, as indicated in the form of Statement of Foreign Currency Requirements, shall be arranged as follows:</p> <ul style="list-style-type: none"> a) Letter of Credit upon contract signing and submission of bank guarantee equal to 60% of value of imported goods. b) On installation and commissioning - 40% executed up to installation and commissioning. <p>Retention amount at a rate indicated in the Appendix to the Form of Tenderer shall be held by the employer from each certificate and to be released at the end of successful defects liability period.</p>

Time within which payment to be made after Interim Payment Certificate signed by Engineer	Within 30 days after certification
Time within which payment to be made after Final Payment Certificate signed by Engineer	Within 30 days after final measurements of works and certification
Appointer of Arbitrator	Chief Justice of The Republic of Kenya
Notice to Employer and Engineer	<p>The Employers address is: Managing Director Kenya Airports Authority P. O. Box 19001 00501 <u>NAIROBI</u></p> <p>The Engineer's address is: General Manager (P & ES), Kenya Airports Authority P. O. Box 19001 00501 <u>NAIROBI</u></p>

Signature of Tenderer.....Date

STATEMENT OF FOREIGN CURRENCY REQUIREMENTS

(See Clause 35 of the Conditions of Contract)

In the event of our Tender for the execution of
.....
..... (name of Contract)
being accepted, we would require in accordance with Clause 21 of the Conditions of Contract, which is attached hereto, the following percentage:

(Figures)
(Words)
.....
of the Contract Sum, (Less Fluctuations) to be paid in foreign currency.

Currency in which foreign exchange element is required:

.....

Date: The Day of 20

- Notes:
- a) Enter 0% (zero percent) if no payment will be made in foreign currency.
 - b) Maximum foreign currency requirement shall be thirty percent (30%) of the Contract Sum in accordance with Clause 11.2 of the Instructions to Tenderers.
 - c) Tenderers must enclose with their tenders, a brief justification of the foreign currency requirements stated in their tenders in accordance with Clause 11.4 of the Instructions to Tenderers.

(Signature of Tenderer)

FORM OF TENDER SECURITY

WHEREAS (hereinafter called “the Tenderer”) has submitted his tender dated for the construction of
..... (name of Contract)

KNOW ALL PEOPLE by these presents that WE having our registered office at(hereinafter called “the Bank”), are bound unto(hereinafter called “the Employer”) in the sum of Kshs..... for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this Day of20.....

THE CONDITIONS of this obligation are:

1. If after tender opening the tenderer withdraws his tender during the period of tender validity specified in the instructions to tenderers
Or
2. If the tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
 - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;
 - (c) rejects a correction of an arithmetic error in the tender.

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

[date]

[signature of the Bank]

[witness]

[seal]

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of tenderer
.....
2. Full address of tenderer to which tender correspondence is to be sent (unless an agent has been appointed below)
.....
3. Telephone number (s) of tenderer
.....
4. Telex address of tenderer
.....
5. Name of tenderer's representative to be contacted on matters of the tender during the tender period
.....
6. Details of tenderer's nominated agent (if any) to receive tender notices. This is essential if the tenderer does not have his registered address in Kenya (name, address, telephone, telex)
.....
.....

Signature of Tenderer

Make copy and deliver to: _____ (Name of Employer)

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2 (c) and 2 (d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

Part 1 – General

Business Name _____

Location of business premises; Country/Town _____

Plot No _____ Street/Road _____

Postal Address _____ Tel No _____

Nature of Business _____

Current Trade License No _____ Expiring date _____

Maximum value of business which you can handle at any time: K. pound _____

Name of your bankers _____

Branch _____

Part 2 (a) – Sole Proprietor

Your name in full _____ Age _____

Nationality _____ Country of Origin _____

*Citizenship details _____

Part 2 (b) – Partnership

Give details of partners as follows:

	<i>Name in full</i>	<i>Nationality</i>	<i>Citizenship Details</i>	<i>Shares</i>
1			
2			
3			

Part 2(c) – Registered Company:

Private or public.....

State the nominal and issued capital of the Company-

Nominal Kshs.....

Issued Kshs.....

Give details of all directors as follows:

Name in full . Nationality. Citizenship Details*. Shares.

1.
.....
2.
.....
3.
.....
4.
.....

Part 2(d) – Interest in the Firm:

Is there any person / persons in(Name of Employer) who has interest in this firm? Yes/No.....(Delete as necessary)

I certify that the information given above is correct.

.....
(Title) (Signature) (Date)

* Attach proof of citizenship

LITIGATION HISTORY

Name of Firm or Partner of a joint venture _____

Firms, including each of the partners of a joint venture, should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution. A separate sheet should be used for each partner of a joint venture

Date (month and year)	Award FOR or AGAINST Firm	Name of client, cause of litigation and matter in dispute	Disputed amount (Current value, Kshs.)

Seal/Signature of Candidate

Date

SELF-DECLARATION FORM

I. ANTI-CORRUPTION DECLARATION

We (insert the name of the company / supplier) _____ declares and guarantees that no offer, gift or payment, consideration or benefit of any kind, which constitutes an illegal or corrupt practice, has been or will be made to anyone by our organization or agent, either directly or indirectly, as an inducement or reward for the award or execution of this procurement.

In the event the above is contravened we accept that the following to apply:

- a) The person shall be disqualified from entering into a contract for the procurement;
or
- b) If a contract has already been entered into with the person, the contract shall be voidable at the option of KAA.
- c) The voiding of a contract by the procuring entity under subsection (b) does not limit any other legal remedy That KAA may have.

Name _____ Signature _____ Date _____

Company Seal / Business Stamp

2. ANTI-FRAUDULENT PRACTICE DECLARATION

We (insert the name of the company / supplier) _____ declares and guarantees that no person in our organization has or will be involved in a fraudulent practice in any procurement proceeding.

Name _____ Signature _____ Date _____

Company Seal / Business Stamp

3. NON - DEBARMENT DECLARATION

We (insert the name of the company / supplier) _____ declares and guarantees that no director or any person who has any controlling interest in our organization has been debarred from participating in a procurement proceeding.

Name _____ Signature _____ Date _____

Company Seal / Business Stamp

MANUFACTURER'S AUTHORISATION FORM¹

To:

RE: _____

WHEREAS _____ [Name of the
Manufacturer] who are established and reputable manufacturers of

_____ and accessories, having
factories at _____

[Address of factory] do hereby Authorize _____

_____ [Name and address of Agent]

to submit a tender, and subsequently negotiate and sign the Contract with you against Tender
No _____ for the above goods manufactured by us.

We hereby extend our full guarantee and warranty as per the Instructions to Bidders for the
goods offered for supply by the above firm against the Invitation to Bidders.

[Signature and Stamped for and on behalf of Manufacturer]

¹ This letter of authorization should be on the letterhead of the manufacturer and should be signed by a person competent and having the Power of Attorney to bind the Manufacturer. It should be included by the Bidder in its bid.

LETTER OF NOTIFICATION OF INTENTION TO ENTER INTO A CONTRACT

Address of Procuring Entity

To:_____

RE: Tender No._____

Tender Name_____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

1. Please acknowledge receipt of this letter of notification signifying your acceptance.
2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.
3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

(FULL PARTICULARS)_____

SIGNED FOR ACCOUNTING OFFICER

LETTER OF ACCEPTANCE

[letterhead paper of the Employer]

_____ [date]

To: _____
[name of the Contractor]

[address of the Contractor]

Dear Sir,

This is to notify you that your Tender dated _____
for the execution of _____
[name of the Contract and identification number, as given in the Tender documents] for the
Contract Price of _____ [amount in figures]
_____ (amount in words)] in accordance with the
Instructions to Tenderers is hereby accepted.

You are hereby instructed to proceed with the execution of the said Works in accordance
with the Contract documents.

Authorized Signature _____

Name and Title of Signatory _____

Attachment: Agreement

PERFORMANCE BANK GUARANTEE (UNCONDITIONAL)

To: _____(Name of Employer) _____(Date)
_____(Address of Employer)

Dear Sir,

WHEREAS _____(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____(hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____(amount of Guarantee in figures)

_____(amount of Guarantee in words), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of

_____(amount of Guarantee in words) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____ 20____ between _____ of [or whose registered office is situated at] _____ (hereinafter called “the Employer”) of the one part AND _____ of [or whose registered office is situated at] _____ (hereinafter called “the Contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

_____ (name and identification number of Contract) (hereinafter called “the Works”) located at _____ [Place/location of the Works] and the Employer has accepted the tender submitted by the Contractor for the execution and completion of such Works and the remedying of any defects therein for the Contract Price of Kshs _____ [Amount in figures], Kenya Shillings _____ [Amount in words].

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
 - (i) Letter of Acceptance
 - (ii) Performance Security
 - (iii) Form of Tender
 - (iv) Conditions of Contract Part I
 - (v) Conditions of Contract Part II and Appendix to Conditions of Contract
 - (vi) Specifications
 - (vii) Drawings
 - (viii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to

execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name _____

Address _____

Signature _____

(ii) Name _____

Address _____

Signature _____

CERTIFICATE OF TENDERER'S VISIT TO SITE

This is to certify that I _____
(Name of bidder or his representative)

of the firm of, _____
(Name of Firm bidding)

In the company of, _____
(Name of KAA representative conducting the visit)

Visited the site in connection with tender for:

SUPPLY AND INSTALLATION OF 2 NO 2MVA STANDBY GENERATORS AND ASSOCIATED WORKS AT JOMO KENYATTA INTERNATIONAL AIRPORT KAA/OT/JKIA/I534/2018-2019

Having previously studied the tender documents,

1. I have carefully examined the site.
2. I have made myself familiar with all the local conditions likely to influence the works, cost thereof and I am fully aware that all work will be done while the areas remain in use.
3. I further certify that I am satisfied with the description of the work and the explanations given by the Client's representative and that I understand perfectly the work to be done as specified and implied in the execution of the contract.

On behalf of Bidder

Signed Date.....

On behalf of Kenya Airports Authority

Signed Date.....